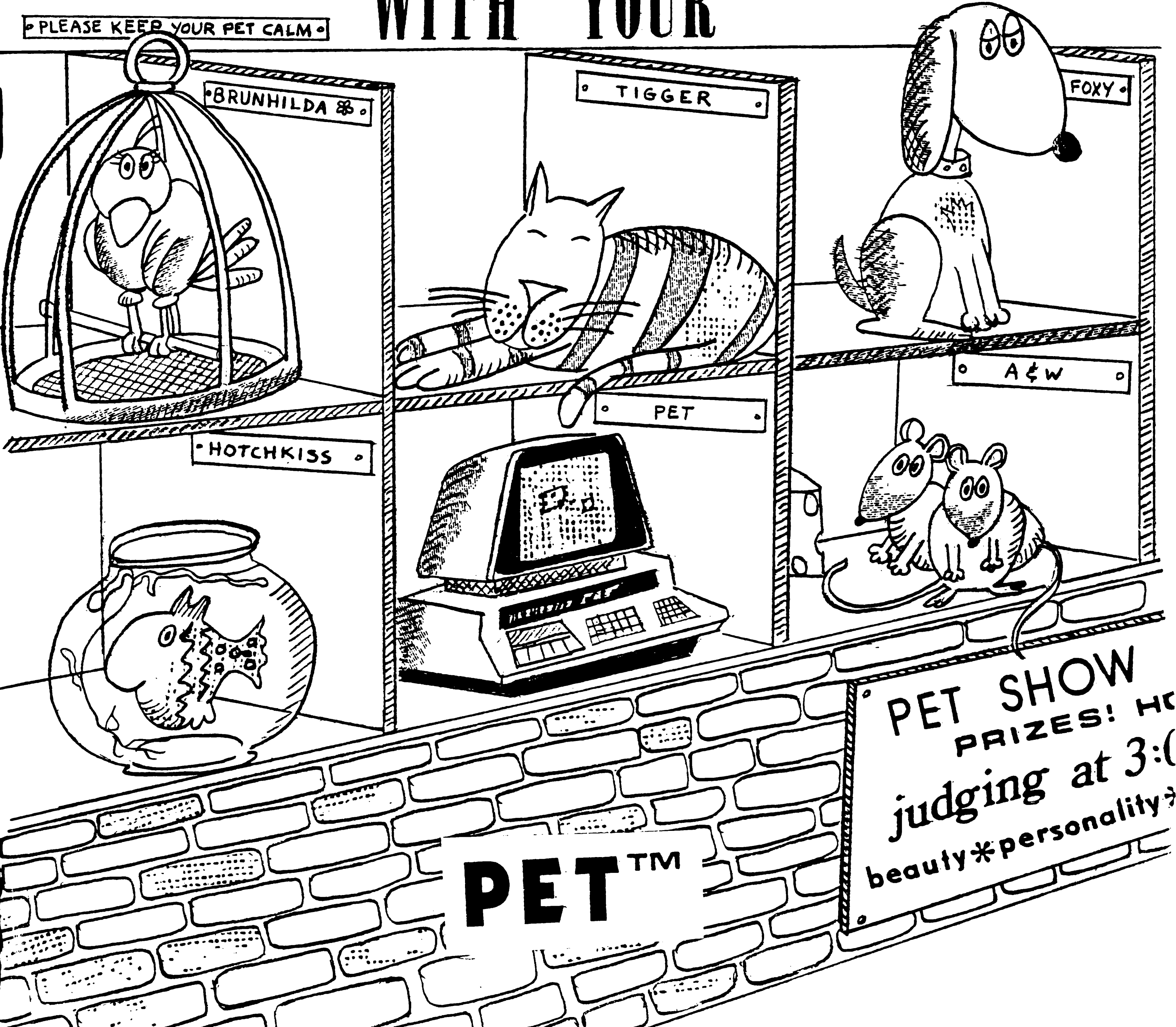
LOOKING GOOD WITH YOUR PET™



by
carole alexander

LOOKING GOOD
WITH YOUR PET

INTERMEDIATE BASIC LANGUAGE
AND PET COMPUTER

BY CAROLE ALEXANDER

COW BAY COMPUTING BOX 515 MANHASSET, NEW YORK 11030

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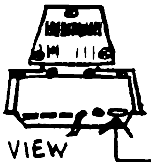
PET All Star REVIEW

IF YOU MISSED BEING A BEGINNER, OR FORGOT SOME OF THE BEGINNING LESSONS, HERE IS A SUMMARY OF PET KNOW-HOW.

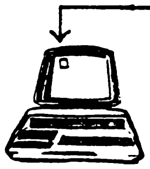
OUR PET IS A MICROCOMPUTER WITH 8K (OR 8,000) BYTES OF MEMORY. IT IS MADE BY COMMODORE OF PALO ALTO, CALIFORNIA AND USES THE BASIC LANGUAGE.



REAR VIEW

*THE ON-OFF SWITCH IS ON THE BACK OF THE COMPUTER. USE YOUR LEFT HAND AS YOU ARE FACING THE SCREEN.

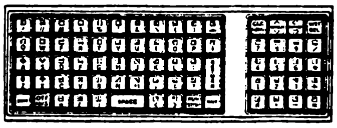
*WHEN THE PET SAY READY ON THE SCREEN, IT IS YOUR TURN TO TYPE.



FRONT VIEW

*THE BLINKING WHITE SQUARE IS CALLED THE CURSOR.

THE KEYBOARD IS SIMILAR TO A TYPEWRITER, EXCEPT THE NUMBERS ARE ALL ON THE RIGHT SIDE IN CALCULATOR STYLE. SEPARATING THE NUMBERS HELPS YOU NOT TO CONFUSE THE LETTER "O" WITH THE NUMBER ZERO (WRITTEN 0.)



HERE ARE THE SPECIAL KEYS YOU NEED TO KNOW:

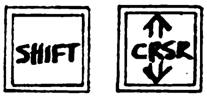
*1. SHIFT HOLD THIS KEY DOWN WHENEVER YOU WANT THE CHARACTER ON TOP OF ANY KEY.

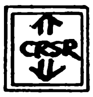
EXAMPLE: SHIFT ♣ X WILL GIVE YOU ♣

*2. RETURN THIS WILL RETURN THE CURSOR TO THE BEGINNING OF THE NEXT LINE. YOU MUST PUSH RETURN EVERY TIME YOU FINISH A STATEMENT AND WANT TO GO TO THE NEXT LINE.

*3. SPACE USE THIS TO MOVE ANY NUMBER OF SPACES.

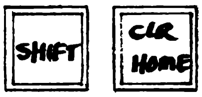
*4. SHIFT ⇐ CRSR ⇒ MOVES THE CURSOR LEFT AND ⇐ CRSR ⇒ MOVES IT RIGHT.

5. 

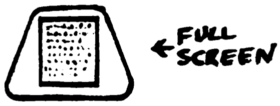
MOVES THE CURSOR UP AND  MOVES IT DOWN.

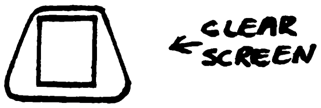
6.

HOME WILL BRING THE CURSOR TO THE UPPER LEFT HAND CORNER OF THE SCREEN.



CLR IS SHORT FOR CLEAR, AND MUST BE USED WITH THE SHIFT KEY. IT WILL CLEAR THE SCREEN AND HOME THE CURSOR AT THE SAME TIME.

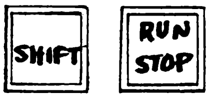




7.

STOP WILL CAUSE A PROGRAM TO STOP WHENEVER YOU PUSH IT DURING EXECUTION. THE STOP KEY IS DIFFERENT FROM THE BASIC STATEMENT STOP IN A PROGRAM.

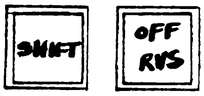
```
30 X=X+1
40 STOP
```



RUN IS USED WITH THE SHIFT KEY, AND WILL LOAD A CASSETTE TAPE. THE RUN KEY IS DIFFERENT FROM THE COMMAND R-U-N, USED TO RUN A PROGRAM.

8.

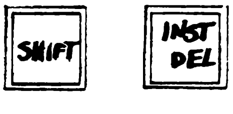
RVS STANDS FOR REVERSE. IT WILL SLOW DOWN THE PRINTING ON THE SCREEN WHILE RUNNING A PROGRAM. IT WILL ALSO GIVE THE KEYBOARD CHARACTERS IN REVERSE FIELD.



OFF WITH THE SHIFT KEY WILL TAKE OFF THE REVERSE FIELD AND RETURN TO REGULAR PRINTING.

9.

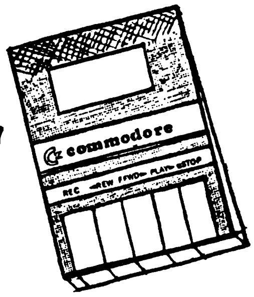
DEL MEANS DELETE. IT ERASES THE CHARACTER TO THE LEFT OF THE CURSOR. POPCORN □ ← needs delete



INST MEANS INSERT. IT WILL MOVE A LINE TO THE RIGHT AND LEAVE SPACES TO PUT IN CHARACTERS.

PROGRAMS FOR THE PET ARE STORED ON CASSETTE TAPES. THERE IS A CASSETTE TAPE RECORDER ON THE PET NEXT TO THE KEYBOARD.

HOW TO LOAD AND RUN A CASSETTE


commodore
REC REW FFWD PLAY STOP

A. INSERT TAPE INTO RECORDER.
B. PRESS REWIND KEY ON RECORDER.
C. AFTER REWINDING, PRESS STOP KEY ON RECORDER.

D. NOW TYPE LOAD ON THE KEYBOARD, OR PRESS SHIFT RUN STOP

(THE PET WILL PRINT PRESS PLAY ON TAPE #1)

E. PRESS THE PLAY KEY ON THE RECORDER.
(THE PET WILL PRINT SEARCHING--[YOU JUST WAIT])
THEN IT PRINTS FOUND PROGRAM
LOADING--[YOU STILL WAIT]
READY

F. WHEN YOU SEE READY YOU TYPE THE WORD RUN AND PRESS THE RETURN KEY.

* * * * * * * *

HOW TO SAVE A PROGRAM ON A CASSETTE

* * * * * * * *

WHATEVER PROGRAM YOU ARE USING ON THE PET, WHETHER FROM A CASSETTE OR YOUR OWN, IT WILL BE ERASED WHEN THE PET IS TURNED OFF. IF YOU WANT TO SAVE IT ON A CASSETTE, THIS IS THE PROCEDURE.

A. TYPE THE WORD SAVE "NAME OF PROGRAM"
(THE PET WILL PRINT PRESS PLAY & RECORD ON TAPE #1)

B. PUSH BOTH PLAY AND RECORD KEYS ON THE RECORDER.
THE PET WILL PRINT OK
WRITING "NAME OF PROGRAM"
YOU WAIT. READY.

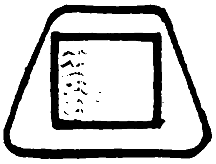
C. WHEN YOU SEE READY, YOUR PROGRAM HAS BEEN SAVED.

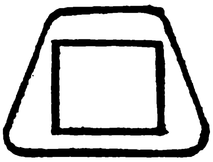
D. CHECK THIS BY REWINDING THE TAPE AND TYPING VERIFY.
(THE PET WILL PRINT OK OR VERIFY ERROR).

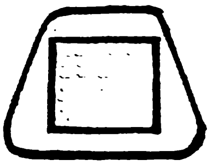
E. IF THERE IS AN ERROR, DO THE SAVE PROCEDURE AGAIN.

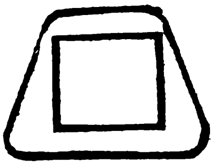
HOW TO LIST AND RUN YOUR OWN PROGRAM

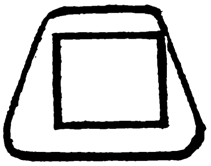
1. TYPE NEW TO ERASE MEMORY BEFORE EACH NEW PROGRAM.
2. AFTER TYPING IN THE PROGRAM, TYPE LIST TO SEE HOW THE PROGRAM HAS BEEN STORED IN MEMORY. IS IT CORRECT?
3. THEN TYPE THE WORD RUN.


PET WITH LISTING


PET CLEARED


PROGRAM LISTED AGAIN


CLEAR AND TYPE NEW


NO MORE LISTING

PET UN-SCRAMBLE

MAIRETNL _ _ _ _ _ _ _ (_)

POUUTT (_) _ _ _ _ _

SAIBC _ (_) _ _ _

GORMPAR _ _ (_) _ _ (_) _

FEARWOST _ _ (_) _ (_) _ _ _

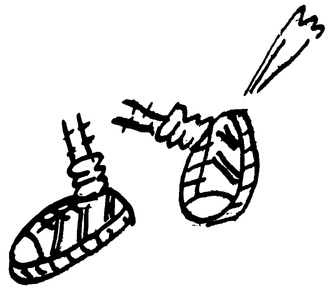
SATSETEC _ _ _ _ _ (_) _ _

RAINYB (_) _ _ _ _ _

WHAT WOULD YOU HAVE IF YOUR FOOT COULD CRY?

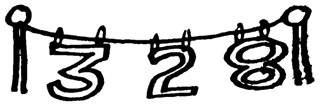
_   _ _ _ _   _ _ _ _

Memory Jogging in BASIC



Do not read this! UNLESS YOU WANT TO, OR UNLESS YOU NEED A REFRESHER IN BASIC PROGRAMMING.

line numbers: EACH LINE OF A PROGRAM MUST BE STARTED WITH A LINE NUMBER. IT IS CUSTOMARY TO USE 10,20,30,... FOR SIMPLICITY, AND TO ALLOW ROOM FOR EXTRA LINES TO BE INSERTED LATER. FOR INSTANCE, 11,12,13 ETC. CAN BE INSERTED BETWEEN LINES 10 AND 20.



GOTO STATEMENT: THIS TELLS THE PET TO GO TO A DIFFERENT LINE. EXAMPLE:

```
40 GOTO 10
```

WHEN THE PET REACHES LINE 40 IT WILL THEN GO TO LINE 10.

print STATEMENT: A QUESTION MARK (?) MAY BE USED AS A SHORTCUT FOR THE WORD PRINT.

➧ A) CALCULATOR MODE: WHEN PRINT OR ? IS USED WITHOUT A LINE NUMBER, THE PET WILL SIMPLY CALCULATE FOR YOU.

EXAMPLE: IF YOU TYPE `PRINT 2+3 Ⓡ`, THE PET WILL SAY 5 (Ⓡ MEANS PUSH THE RETURN KEY).

➧ B) PRINTING SPECIFIC CHARACTERS: TO PRINT OUT WORDS, NUMBERS OR GRAPHICS, PUT THEM IN QUOTATION MARKS.

* EXAMPLE:

```
10  PRINT "ABRACADABRA 1-2-3"
```

* EXAMPLE: WITH A SIMPLE PROGRAM YOU MAY USE THE GRAPHICS AND MAKE PATTERNS.

```
10 ? "*&%#"
20  GOTO 10
```

THIS WILL PRINT:

```
*&%#
*&%#
*&%#
*&%#
```

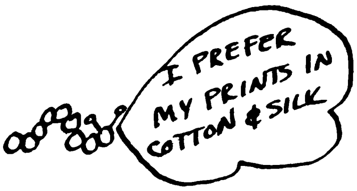
*EXAMPLE: BY INCLUDING A SEMI-COLON (;) AFTER THE QUOTES, THE PATTERN WILL PRINT ACROSS THE SCREEN.

```
10 ?"YELLOW ♥ ";
20 GOTO 10
```

THIS WILL PRINT:

```
YELLOW♥YELLOW♥YE
LLOW♥YELLOW♥YELL
```

*EXAMPLE: BY INCLUDING SEVERAL SPACES BEFORE THE QUOTES, THE PATTERN MAY GO DIAGONALLY.


I PREFER MY PRINTS IN COTTON & SILK

```
10 ? " NAME  _ _ ";
20 GOTO 10
```

THIS WILL PRINT:

```
NAME         NAME
  NAME         NAME
    NAME         NAME
```

➧ C) PRINTING THE <u>VALUE</u> OF A VARIABLE: (NO QUOTES!)

IF X=16 , 16 IS STORED IN MEMORY CELL X.

IF P$ = "RUFUS IS" THEN RUFUS IS IS STORED IN STRING P$.

```
THEN ....... 10 PRINT X     WILL PRINT 16
AND......... 20 PRINT P$    WILL PRINT RUFUS IS
```

VARIABLES MAY BE COMBINED IN A PRINT STATEMENT.

```
EXAMPLE:  10 PRINT P$X        WILL PRINT    RUFUS IS 16
```

➧ D) SKIPPING A LINE: USE A PRINT STATEMENT WITH NOTHING AFTER IT.

```
EXAMPLE:   50 PRINT           OR  50 ?
```

calculator mode: NO LINE NUMBER IS REQUIRED. SIMPLY TYPE PRINT OR ? AND YOUR PROBLEM. PUSH THE RETURN KEY.

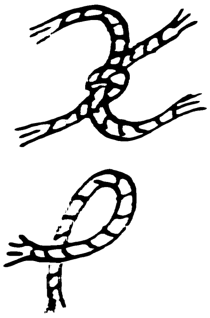
```
EXAMPLE:  ? 1 + 3↑2 ®          YOU WILL GET 10
EXAMPLE:  ? 50-10/5+3 ®        YOU WILL GET 51
EXAMPLE:  ? SQR(25)*2 ®        YOU WILL GET 10
```

THE ARITHMETIC OPERATORS ARE: +,-,*,/,↑ (EXPONENTIATION)

THE INEQUALITY SYMBOLS ARE: =,<,>,< =,> =,<>(NOT = TO)

SOME FUNCTIONS ARE:
SQR(#) FOR SQUARE ROOT
ABS(#) FOR ABSOLUTE VALUE
INT(#) FOR GREATEST INTEGER FUNCTION

variables & string VARIABLES: THESE ARE THE NAMES GIVEN TO MEMORY LOCATIONS IN WHICH YOU STORE INFORMATION.
REGULAR VARIABLES CONTAIN NUMBERS ONLY.
STRING VARIABLES CONTAIN NUMBERS, LETTERS AND/OR GRAPHICS.



TO ASSIGN A VALID OR SAFE VARIABLE NAME TO A MEMORY LOCATION, USE THESE RULES:

SAFE VARIABLE NAMES:

ONE LETTER	A,B,C,...
2 LETTERS	AA,BC,DM,...
LETTER-NUMBER	A1,B8,D9,...
LETTER(LETTER)	B(R),T(S)...
LETTER(NUMBER)	B(2),H(7)...

SAFE STRING VARIABLE NAMES:

ONE LETTER	A$,B$,...
2 LETTERS	AB$,CF$,...
LETTER-NUMBER	C3$,G4$...

WHEN YOU ASSIGN VALUES, THE VARIABLE NAME MUST BE ON THE LEFT SIDE OF THE = SIGN BY ITSELF, AND THE VALUES OR OTHER VARIABLES MUST BE ON THE RIGHT SIDE.

* EXAMPLE:

```
Y=3
M2 = 8+(9/3)
```

* EXAMPLE: STRING VARIABLES ARE ASSIGNED BY USING QUOTATION MARKS.

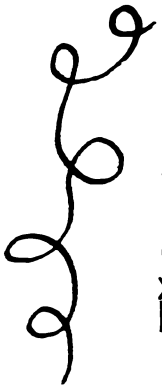
```
Y$ = "PUPPY"
M2$ = "123LOVE"
```

input STATEMENT: THE COMPUTER WILL STOP YOUR PROGRAM WHEN IT REACHES AN INPUT AND TYPE A QUESTION MARK (?) ON THE SCREEN. YOUR PROGRAM WILL NOT CONTINUE RUNNING UNTIL YOU TYPE IN VALUES FOR THE VARIABLE IN THE INPUT STATEMENT.

* EXAMPLE:

```
50 INPUT X,Y                ? 15,2 Ⓡ (PUSH RETURN)
80 INPUT A$                 ?  NERVOUS NELLY Ⓡ
70 INPUT A1,A2,A3,A4,Z      ? 1,2,3,4,8 Ⓡ
```

looping WITH AN if then



* EXAMPLE:

```
10 IF X=2 THEN 40
20 ? "WRONG NUMBER"
30 GOTO 10
40 ? "RIGHT NUMBER"
```

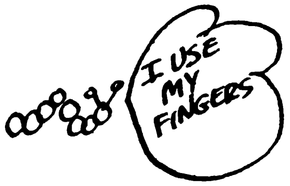
IF-THEN IS A TEST TO SEE IF A CERTAIN CONDITION IS MET. IF X IS NOT EQUAL TO 2 THEN THE PET WILL GO TO THE NEXT LINE (LINE 40) AND PRINT WRONG NUMBER. IF THE TEST IS PASSED AND X IS EQUAL TO 2, THEN THE PET WILL GO TO LINE 40 AND PRINT RIGHT NUMBER.

counter:

```
10 x=x+1      COUNTS BY 1'S   x/0/1/2/3/4/5/...
20 GOTO 10

35 x=5        STARTS AT 5
40 x=x+2            ADDS 2'S   x/5/7/9/11/...
50 GOTO 40

10 x=x-.5              x/0/-.5/-1/-1.5/...
20 GOTO 10
```



THE COUNTER WILL START AT 0 UNLESS ANOTHER STARTING NUMBER IS STATED.

sumer: THIS STATEMENT IS USED WITH A COUNTER TO ADD THE NUMBERS BEING COUNTED. IT WILL START AT 0 UNLESS OTHERWISE STATED.

```
 5 x=x+1                x/0/1/2/3/4/5/...
10 s=s+x  SUMER→ s/0/1/3/6/10/...
15 GOTO 5
```

****

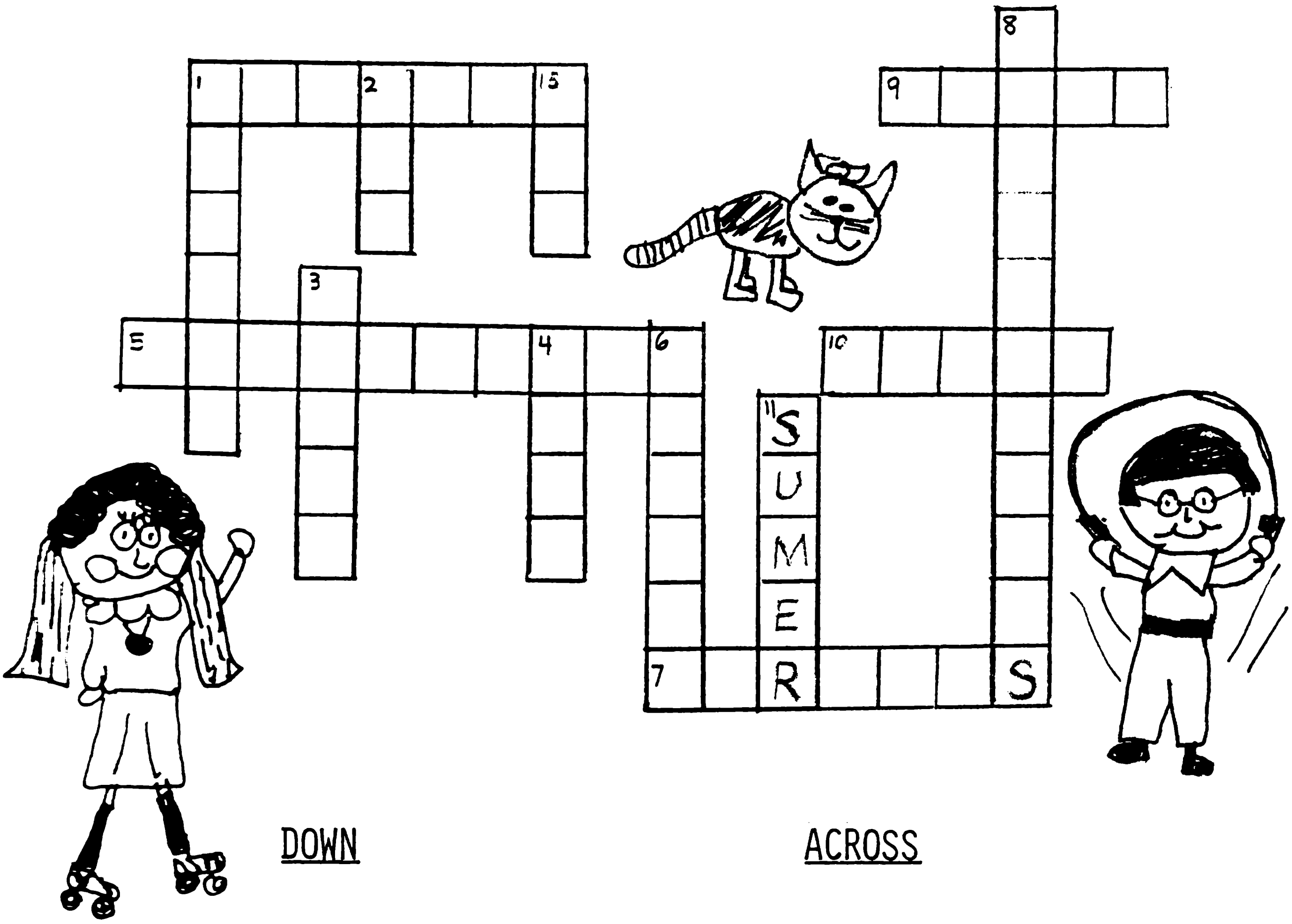
```
20 x=10
25 s=10
30 x=x+5                x/10/15/20/25/30/...
35 s=s+x  SUMER→ s/10/25/45/70/100/...
40 GOTO 30
```

rem STATEMENT: THIS STATEMENT IS SHORT FOR THE WORD REMARK. IT ENABLES THE PROGRAMMER TO PUT IN TITLES AND COMMENTS INTO A PROGRAM. THEY CAN BE INSERTED ANYWHERE IN A PROGRAM; THE COMPUTER IGNORES THEM.

EXAMPLE:

```
10 REM MY AVERAGE
20 INPUT A,B,C,D
30 Y=(A+B+C+D)/4
40 ?"MY AVERAGE IS"Y
```

CROSSWORD: PROGRAMMING



DOWN

1. THE NAME OF THE BLINKING SQUARE ON THE PET SCREEN.

2. THE COMMAND TO ERASE MEMORY.

3. WHAT THE PET SAYS AFTER LOADING YOUR PROGRAM FROM A CASSETTE.

4. THE COMMAND TO COPY A PROGRAM FROM A CASSETTE INTO MEMORY.

15. A COMMAND THAT TELLS THE PET TO IGNORE THE COMMENTS THAT FOLLOW.

6. THE KEY TO PRESS TO SLOW DOWN THE PRINTOUT.

8. IN THE LINE 10 PRINT X
10 IS CALLED A__________.

ACROSS

1. WHAT THE STATEMENT X=X+1 IS CALLED.

5. WHAT < > IS THE BASIC SYMBOL FOR.

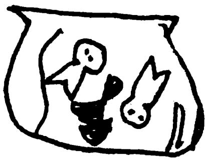
7. LETTERS ARE PUT IN VARIABLES CALLED__________.

9. ? IS A SHORT FORM OF THIS BASIC STATEMENT.

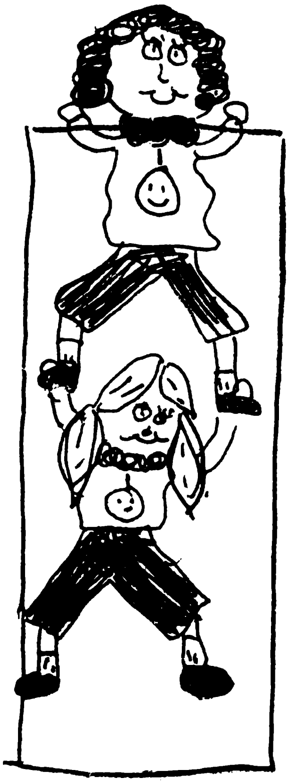
10. IF YOU WANT A PROGRAM TO STOP AND WAIT UNTIL YOU TYPE IN SOMETHIN FROM THE KEYBOARD, USE THIS BASIC STATEMENT.

artwork by Tina Gramenos

WORD SEARCH ON BACKGROUND



```
B H C G Y X O K P Q R E E S T V
D F I A Z N L J I D R V F C B V
U V W C M O M U B A S I C T Z F
S T K P P I M H W F V Z G A E W
J L Q I C S J T W E A H D S Y G
R Y B H G H F K G R C I Q X D X
I M I C R O C O M P U T E R Y Z
J X T E S F P B P P U P O A C N
O R I L C H U K R O M Q E D M B
S U D R T W A L I S T O R A G E
P Z T M Q U U R N L U F K C A D
N A C P O V S E T Y B G B J F T
B Y X W U V T N E M E H I A B C
A T U C W T V R R X Y P A B E R
```



MICROCOMPUTER
VACUUM TUBE
BIT
BYTE
SOFTWARE

STORAGE
CPU
CHIP
OUTPUT

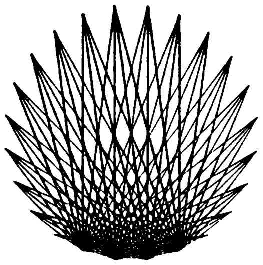
CRT
BASIC
PRINTER
I.C.'S

artwork by Tina Gramenos

WARM UP exercises

1. THIS PROGRAM ADDS AND DIVIDES ANY TWO NUMBERS. SEE IF YOU CAN FILL IN THE STEPS.

```
10 REM___________________________
20 INPUT A,_____
30 X=A+B
40 Y=_______
50 ?"SUM IS" X "AND_________________
60 ?"♥◤◤▬∧"
```



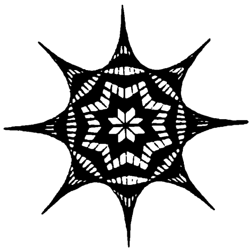
WHEN YOU TYPE RUN

AND INPUT 2,4

WHAT WILL YOUR OUTPUT BE?____________

2. WRITE A PROGRAM SIMILAR TO THE ONE ABOVE WHICH SUBTRACTS AND MULTIPLIES TWO NUMBERS.

```
10__________________________
20__________________________
30__________________________
40__________________________
50__________________________
60__________________________
```



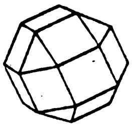
WHEN YOU TYPE RUN

AND INPUT 5,9

WHAT IS THE OUTPUT?_________

WARM UPS

3. THIS PROGRAM MULTIPLIES AND ADDS 3 NUMBERS.
SEE IF YOU CAN FILL IN THE STEPS.



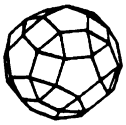
```
10 REM_________________________
20 INPUT A,B,_______
30 X=A*B*C
40 Y=____________
50 ?"THE PRODUCT IS" X _____________
60 ?"********************************"
```

WHEN YOU TYPE RUN

AND INPUT 3,11,9

WHAT IS THE OUTPUT?_________

4. WRITE A PROGRAM LIKE THE ONE ABOVE WHICH SUBTRACTS AND DIVIDES 3 NUMBERS.



```
10____________________________
20____________________________
30____________________________
40____________________________
50____________________________
60____________________________
```

WHEN YOU TYPE RUN

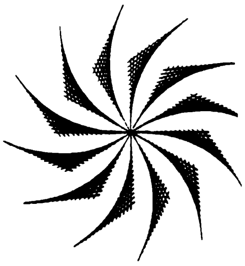
AND INPUT 14,6,3

WHAT WILL YOUR OUTPUT BE?______

warm ups

5. FILL IN THIS PROGRAM WHICH TAKES THE AVERAGE OF 3 TEMPERATURES.

```
10 REM____________________
20 INPUT ________
30 X=____________________
40 Y=X/_______
50 ?"____________________
```



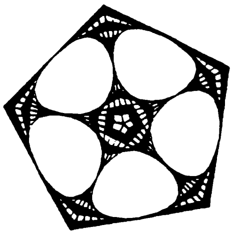
WHEN YOU TYPE RUN

AND INPUT 35,45,60

THE OUTPUT IS________

6. WRITE A PROGRAM SIMILAR TO THE ONE ABOVE WHICH TAKES 4 PRICES AND AVERAGES THEM.

```
_________________________
_________________________
_________________________
_________________________
_________________________
_________________________
_________________________
```



WHEN YOU TYPE RUN

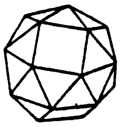
AND INPUT $1.50,.75,$2.35,$5.00

THE OUTPUT IS________________

WARM UPS

7. FILL IN THIS PROGRAM WHICH AVERAGES 4 GRADES.

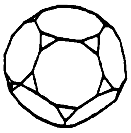
10______________________________
20___________A,B,C,D
30 X=_______________
40 ___ = X/4
50 ______________________________



WHEN YOU TYPE RUN
AND INPUT 98,76,85,65
THE OUTPUT IS_______________

8. WRITE A PROGRAM WHICH WILL FIND THE AVERAGE OF 5 SPEEDS.

____
____
____
____
____
____



WHEN YOU TYPE RUN
AND INPUT 40 MPH,60 MPH,55 MPH,48 MPH AND 50MPH
WHAT WILL THE OUTPUT BE?_______________

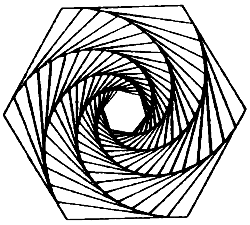
Warm ups

10. SHOW A COUNTER TABLE FOR THIS PROGRAM.

```
10 x=x+1
20 GOTO 10              x/ / / / / /
```

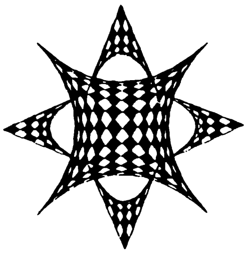
11. FILL IN THE PROGRAM TO COUNT FROM 2 TO 20 BY 1'S AND PRINT THE LAST NUMBER.

```
10 REM________________________
20 x=2
30 x=x+1
40 IF x=20 THEN_______
50 GOTO_______
60 ? x
```



12. WRITE A PROGRAM TO COUNT FROM 5 TO 50 BY 1'S, AND PRINT THE LAST NUMBER.

```
10____________________________
20____________________________
30____________________________
40____________________________
50____________________________
60____________________________
```



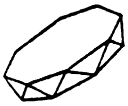
WARM UPS

13. FILL IN THE TABLE FOR THE FOLLOWING PROGRAM:

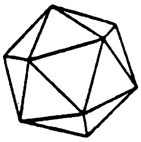
```
5  x=30
10 x=x+5
20 GOTO 10                x/  /  /  /  /  /  /...
```

14. FILL IN THE PROGRAM TO COUNT FROM 5 TO 21 BY 2'S AND PRINT ALL THE NUMBERS.

```
10 REM______________________
20 x=_______
25 ?x
30 x=x+_____
40 IF x<= 21 THEN ______
50 __________
```



15. WRITE A PROGRAM TO COUNT FROM 10 TO 90 BY 20'S AND PRINT ALL THE NUMBERS.



warm ups

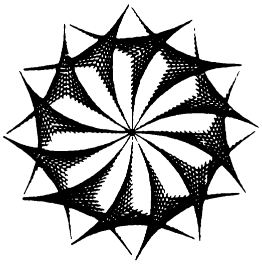
16. FILL IN THE TABLE FOR THE SUMER AND COUNTER.

```
10 X=X+1
20 S=S+X
30 GOTO 10
```

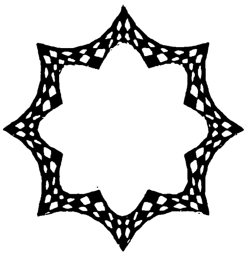
x/ 0/ / / / /...
s/ 0/ / / / /

17. FILL IN THIS PROGRAM TO COUNT FROM 1 TO 5 AND ADD THE NUMBERS, THEN PRINT THE SUM.

```
10 REM_______________________
20 X=X+1
30 S=__________
40 IF ______ THEN _____
50 GOTO _____
60 PRINT ______
```



18. WRITE A PROGRAM TO COUNT FROM 1 TO 10 AND ADD THE NUMBERS THEN PRINT THE SUM.



WARM UPS

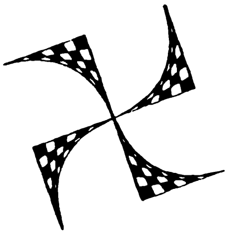
19. FILL IN THE SUMER AND COUNTER TABLE.

```
10 X=X+2
20 S=S+X
30 GOTO 10
```

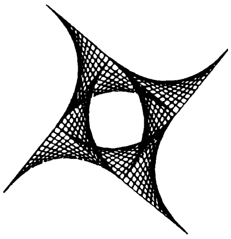
X	0						...
Y	0						

20. FILL IN THE PROGRAM TO COUNT FROM 2 TO 20 AND ADD THE NUMBERS, THEN PRINT THE SUM.

```
10 REM____________________
20 X=___________
30 S=____________
40 IF ______THEN______
50 GOTO ______
60 _____________
```



21. WRITE A PROGRAM TO COUNT FROM 5 TO 55 BY 10'2 AND PRINT THE SUM.

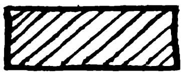


try some!!

BEFORE GOING ON TO INTERMEDIATE LESSONS, YOU SHOULD HAVE A GOOD NUMBER OF THESE PROGRAMS WRITTEN AND RUNNING. USE THIS SELF-EVALUATION TO SEE HOW FAR ALONG YOU ARE.

I HAVE WRITTEN AND RUNNING:
10-13 PROGRAMS----SUPERIOR
7-9 -------------EXCELLENT
4-6 -------------GOOD
1-3 -------------FAIR
BELOW 1----YOU NEED RECYCLING

1. BATTING AVERAGE: COMPUTE A BASEBALL PLAYER'S BATTING AVERAGE BY INPUTTING THE NUMBER OF AT-BATS AND NUMBER OF HITS. THE PROGRAM SHOULD PRINT OUT "WHAT IS THE NUMBER OF TIMES AT BAT?" AND "WHAT IS THE NUMBER OF HITS?" THE BATTING AVERAGE IS COMPUTED BY DIVIDING THE NUMBER OF HITS BY THE NUMBER OF TIMES AT BAT AND MULTIPLYING BY 1000. OUTPUT SHOULD READ "BATTING"______ WITH THE EXACT AVERAGE PRINTED IN THE BLANK. THIS OUTPUT SHOULD APPEAR INSIDE OR OUTSIDE A PICTURE OF ANY BASEBALL SYMBOL. USE INT TO CLEAR DECIMALS.

2. PERIMETER AND AREA: COMPUTE THE PERIMETER AND AREA OF A RECTANGLE BY INPUTTING THE LENGTH AND WIDTH. THE PROGRAM PRINTS "WHAT IS THE LENGTH?" AND "WHAT IS THE WIDTH?" THE PERIMETER AND AREA ARE COMPUTED. OUTPUT SHOULD READ "THE PERIMETER IS"______ WITH THE EXACT PERIMETER PRINTED INSIDE OR OUTSIDE A PICTURE OF A RECTANGLE. → THEN "THE AREA IS"______SHOULD BE FOLLOWED BY A SHADED RECTANGLE  AND THE EXACT AREA.

3. SQUARE ROOTS: THE SQUARE ROOTS OF THE INTEGERS FROM 1 TO 10 ARE PRINTED. "HERE ARE THE SQUARE ROOTS FROM 1 TO 10" SHOULD BE PRINTED AT THE BEGINNING. USE A COUNTER FROM ONE TO TEN TO CALCULATE THE SQUARE ROOTS. THE OUTPUT SHOULD READ "THE NUMBER IS____AND THE SQUARE ROOT IS_____". EACH LINE SHOULD BE FOLLOWED BY A LINE OF GRAPHICS WHICH MAKES THE OUTPUT EASIER TO READ.

4. SPECIAL SQUARE ROOT: FOR ANY POSITIVE NUMBER OR ZERO, THE SQUARE ROOT IS PRINTED. THE PROGRAM SHOULD ASK, "WHAT IS YOUR NUMBER?" WHEN A NUMBER IS GIVEN, TEST TO SEE IF IT IS ZERO OR POSITIVE. IF IT IS, PRINT "YOUR SQUARE ROOT IS"___ AND GIVE THE SQUARE ROOT FOLLOWED BY THE PICTURE OF A HAPPY FACE. IF THE NUMBER IS NEGATIVE, PRINT "SORRY, NO REAL SQUARE ROOT HERE." THIS SHOULD BE FOLLOWED BY A SAD FACE.

TRY SOME!

5. ADD: STARTING WITH A GIVEN NATURAL NUMBER, THE NEXT 25 EVEN OR ODD NATURAL NUMBERS WILL BE PRINTED WITH THE SUM OF ALL THE NUMBERS. THE PROGRAM SHOULD PRINT "I AM GOING TO PRINT OUT THE 25 ODD OR EVEN NATURAL NUMBERS AND THEIR SUM, STARTING WITH THE NATURAL NUMBER YOU GIVE ME. WHAT IS YOUR NUMBER?" THE COMPUTATION WILL NEED A COUNTER AND SUMER. THE NEXT PRINTOUT SHOULD BE "OK. WHEN YOU WANT ME TO START TYPE THE WORD NOW." GIVE YOUR COMPUTATIONS WHEN NOW IS TYPED IN. USE GRAPHICS TO HAVE THE OUTPUT APPEAR IN A BOX OR SOME OTHER CLEVER DESIGN.

6. MANHATTAN ISLAND: PRINT OUT "MANHATTAN ISLAND WAS PURCHASED IN 1626 FOR $24. IF THAT AMOUNT HAD BEEN INVESTED AT 6% INTEREST, COMPOUNDED ANNUALLY, THE INVESTMENT TODAY WOULD BE WORTH____." CALCULATE THE WORTH AND PRINT OUT THE ANSWER WITH A DOLLAR SIGN IN THE MIDDLE OF OR OUTSIDE A BIG FLAG. HINT: USE A COUNTER OR TWO.

7. CELSIUS: SHOWING THE CONVERSION OF DEGREES IN CELSIUS TO DEGREES IN FAHRENHEIT. PRINT "CONVERSION TABLES" AS A HEADING AND SKIP A LINE. COMPUTE THE DEGREES USING A FORMULA, FROM ZERO DEGREES CELSIUS TO 150 DEGREES IN STEPS OF 10 DEGREES (0,10,20,...). EACH LINE OF OUTPUT SHOULD READ "FOR ___DEGREES CELSIUS IT IS ___DEGREES FAHRENHEIT." USE GRAPHICS TO END WITH A PICTURE OF A THERMOMETER OR OTHER WEATHER SYMBOL.

8. ABSOLUTE VALUE: THIS PROGRAM WILL TEST 2 GIVEN NUMBERS IN THE FOLLOWING EQUATION $|A + B| = |A| + |B|$

IN THE BEGINNING PRINT OUT "YOUR NUMBERS CAN BE POSITIVE OR NEGATIVE INTEGERS. WHAT ARE YOUR TWO NUMBERS?" THE NUMBERS ARE TESTED IN THE ABOVE EXPRESSION TO SEE IF IT IS TRUE OR FALSE. PRINT "OKAY" AND THE EQUATION WITH THE NUMBERS IN IT IF TRUE, AND "NO WAY" IF IT IS FALSE. THEN ASK, "DO YOU WANT TO TRY AGAIN?" AND SAY "NICE BEING WITH YOU" WHEN IT IS OVER. (EXAMPLE: FOR THE INTEGERS -2 AND 3, $|-2 + 3| = |-2| + |3|$ IS NOT TRUE.)

9. FRACTIONS,DECIMALS,PERCENTS: PRINT "FRACTION EQUIVALENTS" AS A HEADING AND SKIP A LINE. USE GRAPHICS TO MAKE THE HEADING FANCY. THE PROGRAM SHOULD PRINT THE FRACTION, DECIMAL AND PERCENT VALUES OF NUMBERS MADE WITH NUMERATORS FROM 1 TO 5 AND DENOMINATORS FROM 1 TO 5. (1/1,1/2,1/3,...2/1,2/2,2/3...) EACH LINE SHOULD READ "FRACTION_____DECIMAL_____PERCENT_____." (REMEMBER: THE COMPUTER WILL NOT PRINT FRACTIONS WITHOUT SOME HELP.)

TRY SOME!

10. EVALUATING: PRINT "I WILL EVALUATE 3 DIFFICULT PROBLEMS CALLED STAR, HOUSE AND TREE." THE PROGRAM SHOULD COMPUTE EACH PROBLEM BY CLOSELY FOLLOWING THE ORDER OF OPERATIONS. OUTPUT SHOULD PRINT A PATTERN OF STARS AND THEN "STAR IS"___ WITH THE ANSWER. DO THE SAME FOR HOUSE AND TREE.

$$\text{STAR} = \frac{((2.83)(3.145)(5.17)^2)^3}{3.471}$$

$$\text{HOUSE} = \frac{576}{(38.7)(15.31)}$$

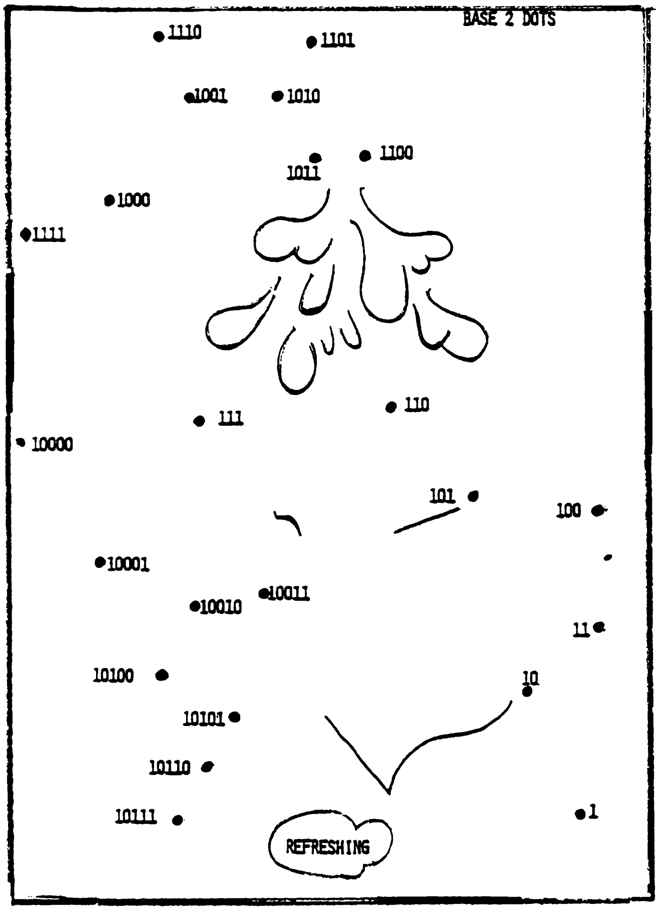
$$\text{TREE} = \sqrt{(37.1 + 6.3)^2}$$

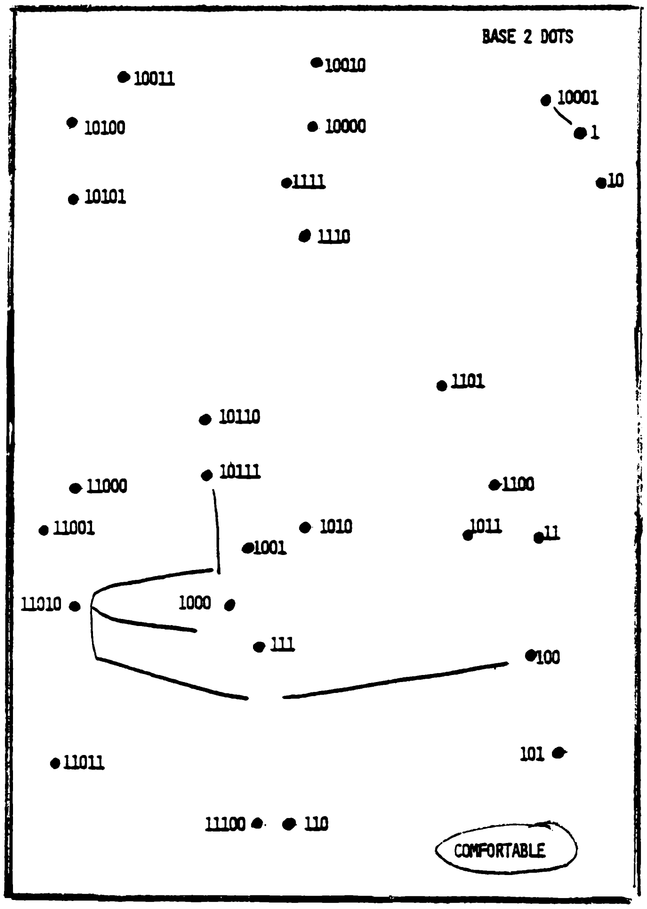
11. FIBONACCI: THE PROGRAM WILL PRINT THE FIRST 100 TERMS OF A FIBONACCI-LIKE SEQUENCE. ASK FOR TWO NATURAL NUMBERS. IN THE FIBONACCI SEQUENCE, THE FIRST 2 NUMBERS ARE ADDED TO GET THE THIRD. THEN THE SECOND AND THIRD ARE ADDED TO GET THE FOURTH, ETC.(EXAMPLE: 1,1,2,3,5,8,13,...) THE OUTPUT SHOULD PRINT FIBONACCI IN BIG LETTERS AND THEN THE SEQUENCE.

12. A FANTASTIC PICTURE USING THE GRAPHICS KEYS.

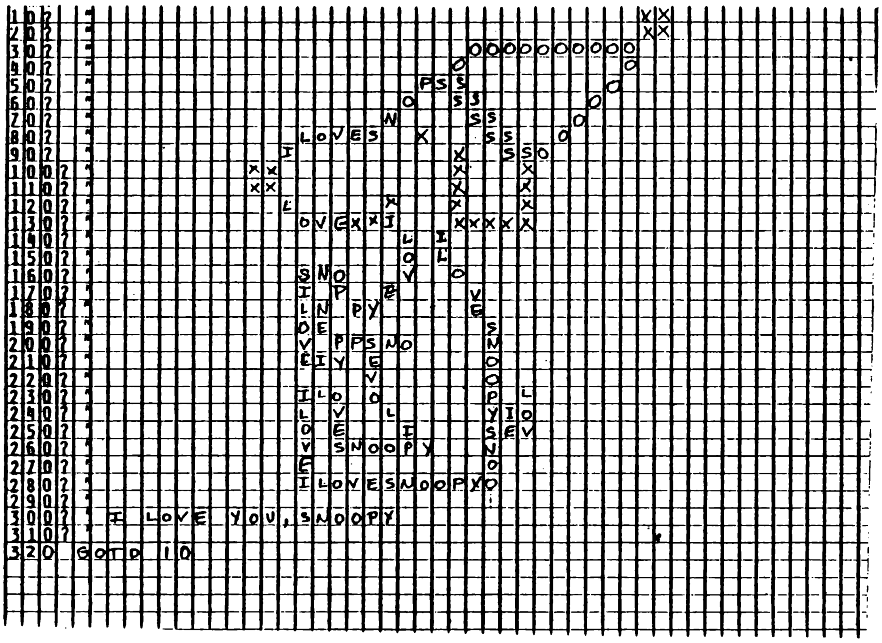
13. INVERSES (RECIPROCALS AND OPPOSITES): THE PROGRAM SHOULD SAY, "I WILL HELP YOU TO FIND ADDITIVE AND MULTIPLICATIVE INVERSES. WHAT IS YOUR NAME?" THEN IT WILL TAKE THE NAME AND ASK, "WHAT IS YOUR INTEGER,(NAME)?" IF THE INTEGER IS 0, PRINT, "SORRY,(NAME), ZERO DOES NOT HAVE A MULTIPLICATIVE INVERSE. THE ADDITIVE INVERSE IS ZERO." IF THE INTEGER IS NOT ZERO, PRINT, "THANK YOU, (NAME), THE MULTIPLICATIVE INVERSE IS_____AND THE ADDITIVE INVERSE IS_____. DO YOU WANT ME TO HELP YOU AGAIN?"

CAN YOU COUNT IN BASE 2?





GRAPHICS: TYPE IN THIS PICTURE. YOU CAN JUST RUN IT OR SAVE IT ON YOUR OWN CASSETTE.



```
10?  "                               XX
20?  "                               XX
30?  "                     OOOOOOOOOO
40?  "                    O         O
50?  "                  PSS        O
60?  "                 O  SS      O
70?  "                N    SS    O
80?  "           LOVES  X   SS  O
90?  "          I         X  SSO
100? "        XX          X   X
110? "        XX          X   X
120? "          L     X   X   X
130? "           OVEXXI   XXXXX
140? "                 L I
150? "                 O L
160? "           SNO   Y  O
170? "           I P  E    V
180? "           LN PY     E
190? "           OE         S
200? "           V PPSNO    N
210? "           EIY E      O
220? "               V      O
230? "           ILO O      P L
240? "           L V  L     YIO
250? "           O E   I    SEV
260? "           V SNOOPY   N
270? "           E          O
280? "           ILOVESNOOPYO
290? "
300? "I LOVE YOU,SNOOPY
310? "
320 GOTO 10
```

Controlling Your PET

1. **reverse field** THIS IS REGULAR FIELD PRINTING ABC

THIS IS REVERSE FIELD PRINTING $\boxed{ABC}$

IF YOU PRESS THE OFF RVS KEY, ALL THE KEYS YOU PRESS AFTER THAT WILL APPEAR IN REVERSE FIELD. TO "UNDO" REVERSE FIELD, SIMPLY PRESS SHIFT OFF RVS

DO WITHOUT PET

1. PRETEND THAT A BOX AROUND A LETTER, SUCH AS $\boxed{A}$ MEANS REVERSE FIELD.

WHICH OF THE FOLLOWING WILL YOU GET IF YOU

PRESS OFF RVS D R I SHIFT OFF RVS B B OFF RVS L E

A) D R I $\boxed{B}\boxed{B}$ L E　　B) $\boxed{D}\boxed{R}\boxed{I}$ B B $\boxed{L}\boxed{E}$

C) $\boxed{D}\boxed{R}$ I $\boxed{B}$ B $\boxed{L}\boxed{E}$　　D) $\boxed{D}$ R I $\boxed{B}$ B $\boxed{L}$ E

2. WE OFTEN USE $\boxed{R}$ FOR THE OFF RVS ON KEY AND ⊟ FOR THE SHIFT OFF RVS ON KEYS (BECAUSE THESE SYMBOLS APPEAR ON THE SCREEN WHEN YOU PRESS THOSE KEYS.)

WHICH STATEMENT BELOW WOULD GIVE THIS OUTPUT ON THE SCREEN?

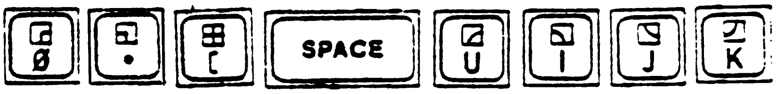
$\boxed{PIZZA}$ PIE

A) $\boxed{R}$ PIZZA PIE　　B) $\boxed{R}$ PIZZA ⊟PIE

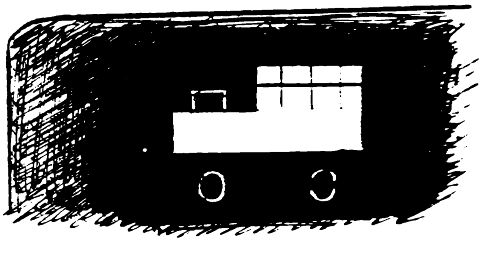
C) $\boxed{R}$ P ⊟IZZA PIE　　D) ⊟PIZZA $\boxed{R}$ PIE

DO WITH PET

USE THESE KEYS



IN REGULAR OR REVERSE FIELD TO COPY THIS PICTURE EXACTLY ON THE PET.



2. list&cont

REMEMBER.....LIST WILL PRINT OUT YOUR PROGRAM AS IT IS IN MEMORY.

WHAT WILL LIST 40 DO? PRINT OUT LINE 40 IS CORRECT.

HOW ABOUT LIST 40-60? YES, PRINT OUT LINES 40 THROUGH 60.

THEN WE HAVE LIST -30. DID YOU SAY ALL THE PROGRAM LINES UP TO AND INCLUDING LINE 30? GOOD.

NATURALLY, LIST 30- WILL LIST ALL PROGRAM LINES FROM 30 ON.

ALSO, REMEMBER STOP DURING EXECUTION OF A PROGRAM WILL STOP IT AND PRINT BREAK IN 40 (OR WHATEVER LINE IT STOPPED AT).

IF YOU WANT TO CONTINUE EXECUTION WHERE THE PROGRAM STOPPED, TYPE CONT. IT STARTS ON THE LINE AFTER THE BREAK.

IF YOU WANT TO START AT THE BEGINNING, TYPE RUN.

DO WITHOUT PET

HERE IS A PROGRAM.

```
10 REM PRACTICE LISTING
20 M=3
30 ? M,SQR(M)
40 M=M+10
50 PRINT:PRINT
60 GOTO 30
```

A COLON (:) LETS YOU PUT 2 LINES IN 1. ——→ 50

1. IF YOU TYPE LIST 40- , WHAT LINES WILL BE PRINTED OUT?

   ____

2. SUPPOSE YOU ARE RUNNING THE PROGRAM AND YOU PRESS THE STOP KEY, AND THE SCREEN SAYS BREAK IN 50. IF YOU TYPE CONT, AT WHAT LINE WILL THE PROGRAM BEGIN EXECUTION?____

TYPE IN THE ABOVE PROGRAM.

WRITE IT HERE ↓

NOW TYPE IN THE COMMAND WHICH WILL LIST LINES 10,20,30 AND 40.__________

TYPE IN A DIFFERENT COMMAND WHICH WILL DO THE SAME THING. ______________

TYPE IN A COMMAND WHICH WILL LIST ONLY LINE 50. ____________________

RUN THE PROGRAM AND PRESS THE STOP KEY. KEEP DOING THIS UNTIL THE SCREEN SAYS BREAK IN 30 . THEN TYPE CONT AND FINISH THE PROGRAM.

3. control keys ◆

IF YOU WOULD LIKE TO CLEAR THE SCREEN, OR MOVE THE CURSOR, WHILE YOUR PROGRAM IS RUNNING, YOU MAY DO IT WITH THESE PROGRAM STATEMENTS.

?"♥"WILL CLEAR THE SCREEN. USE SHIFT CLR SCREEN HOME

?"]]] " WILL MOVE THE CURSOR TO THE RIGHT 3 TIMES. USE ⇐ CURSOR ⇒

?" Q Q" WILL MOVE THE CURSOR DOWN 2 TIMES. USE ⇑ CURSOR ⇓

?" ◨ " WILL MOVE THE CURSOR TO THE LEFT ONCE. USE SHIFT ⇐ CURSOR ⇒

?" R KOALA" WILL PRINT THE WORD KOALA IN REVERSE FIELD. USE OFF RVS ON

?" R ME ▁OW" WILL PRINT ME OW.
(▁ RELEASES REVERSE FIELD) USE SHIFT OFF RVS ON

DO WITHOUT PET

TO CLEAR THE SCREEN (?"♥")YOU MUST TYPE ?" ☐ ☐"

TO PROGRAM LEFT CURSOR (?"]")YOU MUST TYPE ?" ☐ ☐ "

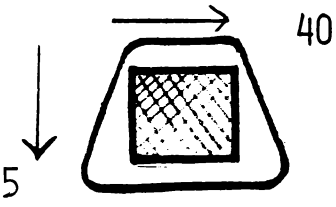
1. HOW WILL YOU GET ?"Q" ....TYPE ?"
2. HOW WILL YOU GET ?"◨ " ....TYPE ________________
3. HOW WILL YOU GET THE WORD 'BLIMP' WRITTEN IN REVERSE FIELD?

____

4. IF YOU WANT TO PRINT THE WORD 'BLIMP' 12 SPACES TO THE RIGHT, YOU MUST TYPE ?"RC RC RC RC RC RC RC RC RC RC RC RC BLIMP"
(RC STANDS FOR THE KEY RIGHT CURSOR [⇐ CURSOR ⇒])
HOW WILL YOU PRINT THE WORD 'LUMP' 5 SPACES TO THE RIGHT AND 3 DOWN?(USE RC FOR RIGHT CURSOR AND DC FOR DOWN CURSOR).

____

5. THE PET SCREEN IS 40 CHARACTERS WIDE AND 25 CHARACTERS LONG. WRITE A PROGRAM STATEMENT WHICH WILL CLEAR THE SCREEN AND PRINT THE WORD 'HELLO' IN REVERSE FIELD IN THE MIDDLE OF THE SCREEN.



____

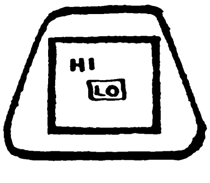
____

DO WITH PET

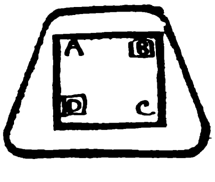
1. TRY THIS! (REMEMBER RC MEANS [⇐ CURSOR ⇒] ,DC MEANS [⇑ CURSOR ⇓] , LC MEANS [SHIFT] [⇐ CURSOR ⇒], UC MEANS [SHIFT] [⇑ CURSOR ⇓] AND [R] MEANS [OFF RVS]).

```
10 ?"♥"
20 ?" RC(10 TIMES)DC(5 TIMES) HI"
30 ?" RC(20 TIMES)DC(10 TIMES)LC(2 TIMES)
     UC(2 TIMES) [R] LO "
```

WHEN YOU TYPE RUN YOU SHOULD GET



2. WRITE AND RUN A PROGRAM WHICH WILL PUT A,B,C,D IN EACH CORNER OF THE SCREEN, ONE LETTER IN EACH CORNER. MAKE B AND D IN REVERSE FIELD. GOOD LUCK!
IT SHOULD LOOK LIKE THIS ⟶



4. string along

ALL THE INEQUALITY RELATIONS, AS WELL AS THE EQUAL SIGN, MAY BE USED WITH STRINGS.

`A$=B$` PUTS THE WHOLE CONTENTS OF B$ INTO A$

`D$="21 NOODLES"` PUTS THE WORDS 21 NOODLES INTO D$

`IF A$="YES" THEN 90` IS A TEST TO SEE IF THE WORD YES IS IN A$

`IF A$<>"NO" THEN 100` WILL TEST TO SEE IF A$ HAS SOMETHING OTHER THAN THE WORD NO.

YOU MAY ALPHABATIZE BY USING < (LESS THAN) AND > (GREATER THAN).
FOR EXAMPLE, "A"<"B", "CAT"<"DOG", "ABE"<"ABEL",
AND "BUMPSTEAD" < "BURNS"

`IF A$>"SMITH" THEN 60` ASKS IF A$ IS AFTER SMITH ALPHABETICALLY.

DO WITHOUT PET

WRITE A PROGRAM STATEMENT WHICH WILL....

1. PUT THE WORD POODLE123 INTO A$ ______________________
2. PRINT OUT THE CONTENTS OF A$ FOLLOWED BY THE CONTENTS OF X ______________________
3. PUT THE CONTENTS OF C$ IN A$ ______________________
4. TEST TO SEE IF THE CONTENTS OF B$ IS THE WORD FIDO ______________________
5. TEST TO SEE IF THE CONTENTS OF X$ COMES AFTER THE CONTENTS OF Y$ ALPHABETICALLY. ______________________
6. TRUE OR FALSE: "SMITH"<"SMYTH" ______________

READ THIS PROGRAM:

```
3 REM KNOCK KNOCK JOKE
5 ?"♥"
10 ?"KNOCK KNOCK"
20 INPUT B$
30 IF B$ < >"WHO'S THERE?" THEN 10
40 ?"IVAN"
50 INPUT C$
60 IF C$ < >"IVAN WHO?" THEN 40
70 ?"IVAN WORKING ON THE RAILROAD"
```

TELL WHAT THE OUTPUT WILL BE IF...

YOU TYPE IN WHO ELSE? ______________
YOU TYPE IN WHO'S THERE? ______________
(DON'T FORGET QUESTION MARK)

YOU TYPE IN IVAN WHO? ______________
YOU TYPE IN IVAN WHAT? ______________

IN THIS PROGRAM, SUPPOSE A$ AND B$ ARE NAMES OF PERSONS AND A AND B ARE THEIR ADDRESS NUMBERS, WE WANT TO PRINT OUT THE NAME OF THE PERSON WHO COMES FIRST ALPHABETICALLY.

```
3 REM ALPHABETIZE NAMES
5 ?"♥"
10 INPUT A$,A,B$,B
20 IF A$<B$ THEN 40
30 ? B$ " LIVES AT" B
35 GOTO 50
40 ?A$ " LIVES AT"  A
50 STOP
```

WHAT WILL THE OUTPUT BE IF THE INPUT IS REGGIE,35,PETE,43?

____

WHAT WILL THE OUTPUT BE IF THE INPUT IS BELLAMY,40,GRASSO,52?

____

WHAT WILL BE THE OUTPUT FOR TOM JONES,18 AND TOM JONES, 58?

____

ASSUMING WE ARE NUMBERING PLOTS IN THE TOWN GARDEN IN ALPHABETICAL ORDER, WHICH TOM JONES WILL GET #1? ______

HERE IS ANOTHER ONE:

```
2 REM AGE BEFORE BEAUTY
3 ?" ♥ "
5  ?"GIVE NAME,AGE,NAME,AGE"
10 INPUT X$,X,Y$,Y
20 IF X > Y THEN 40
30 ?Y "YEAR OLD "Y$ "IS THE OLDEST"
35 GOTO 50
40 ? X "YEAR OLD"X$ "IS THE OLDEST"
50 STOP
```

X$ AND Y$ ARE NAMES
X AND Y ARE THEIR AGES.

WHAT WILL THE OUTPUT BE FOR REGGIE,35,PETE,43?

____

WHAT WILL THE OUTPUT BE FOR GORGEOUS GEORGE,30, CURIOUS GEORGE,30?

____

HOW WOULD YOU FIX IT?

____

TYPE THIS PROGRAM IN:

```
3 ?"♥ "
5?"WHAT IS YOUR KNOCK KNOCK JOKE?"
10 INPUT A$
20 IF A$< > "KNOCK KNOCK" THEN 5
30 ?"WHO'S THERE?"
40 INPUT B$
50 ?B$ " WHO?"
60 INPUT C$
70 ?" HA HA ";
80 GOTO 70
```

NOW RUN THE PROGRAM
AND GIVE THE OUTPUT EACH TIME.

1. ANSWER LINE 5 WITH I DON'T HAVE ONE.
   OUTPUT______________________
2. ANSWER LINE 5 WITH KNOCK KNOC
   OUTPUT______________________
3. ANSWER LINE 40 WITH YOUR JOKE
   ____
4. ANSWER LINE 60 WITH THE REST OF YOUR JOKE.
   OUTPUT______________________

A. RUN THE PROGRAM ALPHABETIZE FROM THE PREVIOUS PAGE. CHECK TO SEE THAT THE ANSWERS YOU GAVE WERE CORRECT.

B. WHAT HAPPENS IF YOU INPUT 35,REGGIE,23,PETE?______________________
WHY DOES THIS HAPPEN?______________________

C. RUN THE PROGRAM AGE BEFORE BEAUTY FROM THIS PAGE.
CHECK TO SEE THAT THE ANSWERS YOU GAVE WERE CORRECT.

D. WHAT HAPPENS IF YOU INPUT 1,2,3,4?______________________
WHY DOES THIS HAPPEN?______________________

homework

WRITE A PROGRAM USING STRINGS WHICH TELLS A JOKE. THE FIRST LINE OF YOUR PROGRAM SHOULD GIVE DIRECTIONS: "IF YOU DON'T KNOW THE ANSWER.....SAY I DON'T KNOW."

IF THE PERSON ANSWERS CORRECTLY, SAY "YOU'RE SMART." IF THEY SAY "I DON'T KNOW," GIVE THE ANSWER IN REVERSE FIELD IN THE MIDDLE OF THE SCREEN AND GIVE A LAUGH.

IF THEY ANSWER INCORRECTLY, SAY "NOT REALLY" AND REPEAT THE JOKE. IF YOU NEED TO BORROW SOME JOKES,HERE ARE 3 YOU CAN USE.

JOKE #1: WHERE DO BABY MONSTERS COME FROM?

JOKE #2: WHAT IS A MONSTER'S NORMAL EYESIGHT?

JOKE #3: WHAT DO YOU GET WHEN YOU CROSS 100 PIGS WITH 100 DEER?

USE THIS'HELPER PROGRAM' OR WRITE YOUR OWN.

CLEAR THE SCREEN ____________________

GIVE DIRECTIONS ____________________

SKIP 3 LINES ____________________

ASK YOUR JOKE ____________________

INPUT THE ANSWER ____________________

IF CORRECT,
GO TO "YOUR'RE SMART"____________________

IF "I DON'T KNOW",
GO TO ANSWER ____________________

ANYTHING ELSE,
ANSWER "NOT REALLY" ____________________

GO BACK TO JOKE ____________________

SAY "YOU'RE SMART"____________________

GO TO END ____________________

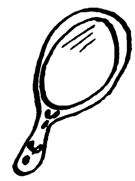
GIVE JOKE ANSWER
IN REVERSE FIELD
IN MIDDLE OF SCREEN____________________

PRINT A LAUGH____________________

END PROGRAM____________________

ANSWERS:
1.FRANKENSTORKS 2. 20-20-20-20 3. 200 SOWS AND BUCKS

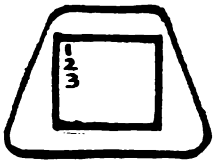
I Like Your STYLE



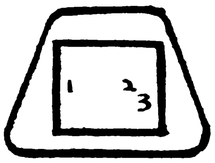
●UTPUT F●RMATS ARE THE WAY YOUR OUTPUT L●●KS ON THE SCREEN

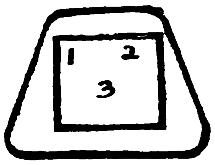
HERE IS ONE OF THE "REGULAR" FORMATS
OR WAYS OF PRINTING OUT.

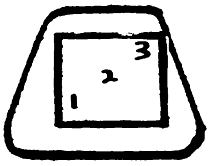
```
100 REM REGULAR
110 X=1:Y=2:Z=3
120 ?X
130 ?Y
140 ?Z
```

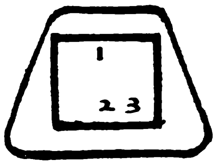


THERE ARE MANY OTHER WAYS YOUR PROGRAM
CAN PLACE OUTPUT ON THE SCREEN.









with commas & numbers

```
5 ?"♥": ?"TYPE 3 NUMBERS"
10 INPUT X,Y,Z
20 ?:?
30 PRINT X,Y,Z, "R COMMAS"
```

WHEN YOU TYPE RUN AND

INPUT 1,2,3

THE OUTPUT WILL BE ▶

```
 1         2         3         COMMAS
```

NOTICE! EACH CHARACTER
IS PUT INTO A SEPARATE
FIELD. THERE ARE 4 FIELDS
PER LINE STARTING IN
COLUMNS 2,12,22 AND 32.

with commas & strings

```
32 ?:?
35 ?"TYPE 3 WORDS"
40 INPUT A$,B$,C$
45 ?:?
50 PRINT A$,B$,C$, "R COMMAS"
```

WHEN YOU TYPE RUN AND

INPUT 1,2,3 AND
FROG,TADPOLE,TOAD

THE OUTPUT WILL BE ▶

```
 FROG      TADPOLE   TOAD      COMMAS
```

Semi-colonS & numbers

Semi-colonS & strings

```
55 ?:?
60 PRINT X;Y;Z; "[R] SEMI-COLON"

65 ?:?
70 PRINT A$;B$;C$; "[R] SEMI-COLON"
```

WHEN YOU TYPE RUN AND

```
INPUT 1,2,3 AND
      FROG,TADPOLE,TOAD
```

THE OUTPUT WILL BE ➧

```
 1  2  3  SEMI-COLON
FROGTADPOLETOAD SEMI-COLON
```

NOTICE! EACH NUMBER IS SEPARATED FROM THE NEXT BY 2 BLANKS. WHEN PRINTING STRINGS THERE ARE NO BLANKS.

with commas & Semi-colonS & LARGE numbers

LARGE AND SMALL NUMBERS ARE WRITTEN IN SCIENTIFIC NOTATION. FOR EXAMPLE: 1.23456789E+10 MEANS $1.23456789 \times 10^{10}$

AND 5.45454545E-9 MEANS $5.45454545 \times 10^{-9}$

WHEN YOU TYPE RUN AND

```
INPUT 123456789,1234567890,12345678901
      VERY,BIG,NUMBERS
```

THE OUTPUT FOR COMMAS WILL LOOK LIKE THIS ➧

```
 123456789            1.23456789E+09
 1.23456789E+10       COMMAS

VERY        BIG       NUMBERS   COMMAS
```

NOTICE! IF YOU ARE USING COMMAS, AND THE NUMBERS ARE BIGGER THAN THE FIELD(10 SPACES),ONE FIELD IS SKIPPED TO MAKE IT EASIER TO READ.

THE OUTPUT FOR SEMI-COLONS WILL LOOK LIKE THIS

```
 1.23456789  1.23456789E+10  1.23456789E+
10  SEMI-COLON

VERYBIGNUMBERS SEMI-COLON
```

NOTICE! WHEN YOU USE SEMI-COLONS, 2 SPACES WILL BE LEFT BETWEEN THE NUMBERS REGARDLESS OF HOW BIG OR SMALL THE NUMBERS ARE.

DO WITHOUT PET

EXERCISE:
DRAW AN APPROXIMATE OUTPUT PICTURE FOR THE STATEMENT

```
75  ?X;Y,A$;B$,C$
```

ASSUME YOU INPUT 2 AND 4 FOR X,Y AND CAT,FELINE,TABBY FOR A$,B$,C$.

* * * * * * * * * *

EXERCISE:
TYPE IN THE PROGRAM ON THE PREVIOUS PAGES FROM LINE 5 THROUGH LINE 70. RUN EACH OF THE INPUTS LISTED AND CHECK YOUR RESULTS WITH THE PICTURES.

THEN RUN THE PROGRAM USING THE INPUT LISTED ABOVE AND CHECK THE ANSWER YOU GAVE.

SPACES (SPC)

```
PRINT SPC(10)X
```

WILL SKIP 10 SPACES BEFORE PRINTING THE VALUE OF X.

```
PRINT X SPC(2)Y
```

WILL PRINT THE VALUE OF Y 2 SPACES AFTER THE VALUE OF X.

```
TYPE NEW

10 ?"♥"
15 ?"TYPE 3 NUMBERS"
20 INPUT X,Y,Z
30 PRINT SPC(10)X SPC(3)Y SPC(5)Z "[R] SPACES"
```

WHEN YOU TYPE RUN AND

`INPUT 1,2,3`

THE OUTPUT WILL BE

```
           1   2      3 SPACES
```

DO WITHOUT PET

EXERCISE: FINISH THIS STATEMENT SO Y WILL PRINT FAR FROM X BUT Z WILL PRINT CLOSE TO Y.

? SPC(20)X ____________________

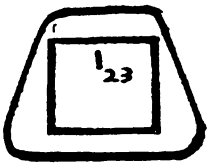
DO WITH PET

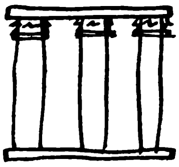
EXERCISE: HOW WOULD YOU CHANGE LINE 30 (ADD MORE LINES IF NECESSARY) TO GET THE FOLLOWING OUTPUT?

____

____

____





COLUMNS(TAB)

```
35  ?:?
40 ?TAB(10)X TAB(16)Y TAB(30)Z "[R] COLUMNS"
```

`PRINT TAB(10)X` WILL PRINT THE VALUE OF X IN THE 10TH COLUMN.

`PRINT TAB(22)X TAB(24)Y` WILL PRINT THE VALUE OF Y 2 SPACES AFTER THE VALUE OF X. WHY??

BECAUSE THE 24TH COLUMN IS 2 SPACES AFTER THE 22ND COLUMN.

WHEN YOU TYPE RUN AND

INPUT 4,5,6

THE OUTPUT WILL BE ➧

```
  4    5         6 COLUMNS
```

DO WITHOUT PET

EXERCISE 1: FINISH THIS STATEMENT USING TAB SO Y WILL PRINT CLOSE TO X.

```
? TAB(12)X ____________
```

EXERCISE 2:TAKE A GUESS AT THE OUTPUT YOU WILL GET FROM THESE PROGRAMMING STEPS:

DO WITHOUT PET

```
40 ?"TEST 1" SPC(20) "SPACES"
50 ?"TEST 2" TAB(20) "COLUMNS"
```

DO WITHOUT PET

EXERCISE 3: WRITE A PROGRAM USING TAB OR SPC AND PRINT TO MAKE A 3 BY 5 RECTANGLE IN THE CENTER OF THE SCREEN.

____

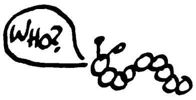
____

____

____

____

____



EXERCISE 4:** SQUBE PROGRAM **

DO WITHOUT PET

HERE IS A PROGRAM WHICH TAKES 50 EVEN NUMBERS AND CALCULATES THEIR SQUARES AND CUBES (RAISES THEM TO THE 2ND AND 3RD POWERS.)

```
10 ___________              HEADINGS
20 X=X+2
30 IF X > 100 THEN 70
40 Y=X*X: Z=X*X*X
50 _______________          PRINT X,Y,Z
60 GOTO 20
70 STOP
```

FINISH THE PROGRAM BY MAKING THE EVEN NUMBERS, THE SQUARES AND CUBES PRINT OUT WITH THE HEADINGS "NUMBERS", "SQUARES" AND "CUBES" IN 3 COLUMNS. THE COLUMNS SHOULD LOOK FAIRLY EQUAL IN SIZE.

WRITE YOUR LINES HERE: 10_________________________

50_________________________

EXERCISE 1: WRITE A STATEMENT USING TAB WHICH WILL MAKE YOUR OUTPUT LOOK LIKE LINE 30 ON P.34. (FIND THE CORRECT TABS BY TRYING DIFFERENT NUMBERS.)

____

EXERCISE 2: A. RUN ALL THE STEPS FROM PAGE 33 SPACES AND PAGE 34 COLUMNS.

B. TYPE IN THIS PROGRAM:

TYPE NEW

```
10 ?"♥"
20 ?" WHAT IS A AND B?":INPUT A,B
30 ?SPC(A) A
40 ?TAB(B) B
50 GOTO 20
```

BY USING VARIABLES IN THE PARENTHESES FOR SPC AND TAB, THE NUMBER OF SPACES AND COLUMN WILL CHANGE EACH TIME.

TRY IT WITH A=1,B=1.
TRY IT WITH A=5,B=5.
TRY IT WITH A=1,B=5.

CONTINUED ON NEXT PAGE

TRY IT WITH A=10 AND B=1.

TRY IT WITH 5 MORE OF YOUR OWN.

CAN YOU FIND AN A AND B THAT WILL MAKE YOUR NUMBERS APPEAR ON THE FAR RIGHT EDGE OF THE SCREEN? ____________________

EXERCISE 3: TYPE IN THIS PROGRAM WHICH USES SPC AND TAB AND RUN IT JUST FOR FUN. SEE IF YOU UNDERSTAND WHAT IS HAPPENING.

FIRST TYPE NEW

```
 5 ?"♥"
10 J=1
20 ? TAB(J) "M"
30 ? SPC(J) "P"
40 J=J+1
50 IF J=100 THEN 70
60 GOTO 20
70 STOP
```

WHAT DO YOU THINK THIS KIND OF A PROGRAM WOULD BE GOOD FOR?

§ homework §

1. DRAW AN APPROXIMATE OUTPUT FORMAT FOR EACH OF THESE:

   A) `? X, Y; A$, B$`

   WHEN X=2,Y=8,A$="ACE",B$="PILOT"

   B) `? "TOUCH"; "MY"; 23, "TOES"`

2. WHICH OF THE FOLLOWING STATEMENTS WOULD MAKE THIS OUTPUT FORMAT?

```
 7               ICECREAM           CONES
```

   A) `?7,"ICE";"CREAM","CONES"`

   B) `?7,"ICE";"CREAM";"CONES"`

   C) `?7;"ICE","CREAM";"CONES"`

   D) `?7;"ICE";"CREAM";"CONES"`

3. FINISH THIS STATEMENT USING TAB SO THAT POLISH WILL PRINT 5 SPACES TO THE RIGHT OF FURNITURE .

```
? TAB(20)"FURNITURE"TAB(  )"POLISH"
```

4. FINISH THIS STATEMENT USING SPC SO THAT PEEL WILL PRINT 5 SPACES TO THE RIGHT OF BANANA.

```
? SPC(20)"BANANA"SPC(  )"PEEL"
```

5. FINISH THE PROGRAM SQUBE ON PAGE 36 BY PRINTING THE COLUMN "SQUARES" ALL THE WAY AT THE LEFT OF THE SCREEN, AND THE COLUMN "CUBES" AT THE RIGHT OF THE SCREEN.

   LINE 10______________________________

   LINE 50______________________________

6. WRITE A PROGRAM USING TAB OR SPC AND PRINT TO MAKE THE NAME MICKEY PETER MOUSE (OR YOUR OWN) PRINT IN TRIANGULAR FORM.

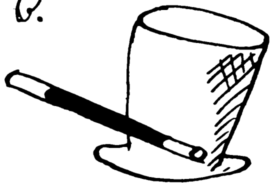
   ____

   ____

```
         PETER
   MICKEY     MOUSE
```

FOR my NEXT trick

PROGRAMMING WITH THE for next loop



SEE IF YOU CAN READ THIS PROGRAM

DO WITHOUT PET

```
10 X=X+1
15 ? X
20 IF X=7 THEN 40
30 GOTO 10
40 STOP
```

THIS TABLE IS FOR FILLING IN

X/1 / / / / / / / /

WHAT DOES THE PROGRAM DO? ⇨

1. IT STARTS COUNTING AT____
2. IT COUNTS BY _______
3. IT STOPS COUNTING AT_______
4. PRINTS FROM____ TO_____

THIS PROGRAM DOES THE SAME THING!!

```
10 FOR X=1 TO 7  <——THIS MEANS START COUNTING AT 1
                    AND STOP AT 7
20 ? X
30 NEXT X  <————————THIS MEANS GO BACK TO THE FOR
                    STATEMENT AND KEEP COUNTING.
```

HERE IS ANOTHER PROGRAM. WHAT DOES IT DO?

```
5 MY=15
10 MY=MY+1
15 ? MY
20 IF MY=50 THEN 40
30 GOTO 10
40 STOP
```

⇨

1. STARTS COUNTING AT_____
2. COUNTS BY_____
3. STOPS COUNTING AT_____
4. PRINTS FROM____TO_____

NOW, MAKE THIS PROGRAM DO THE SAME THING

⇨

```
10  FOR MY=____TO_____
20 ? MY
30 ______________
```

TRY IT AGAIN. HERE IS A PROGRAM WHICH COUNTS BY 2'S.

```
5 LA=10
10 LA=LA+2
15 ? LA
20 IF LA=70 THEN 40
30 GOTO 10
40 STOP
```

HERE'S WHAT IT DOES.

1. STARTS COUNTING AT______
2. COUNTS BY_______
3. STOPS COUNTING AT______
4. PRINTS FROM____TO_______

LA/ / / / / / /...

MAKE THIS PROGRAM DO THE SAME THING.

```
10 FOR LA=_____ TO ____STEP 2
20 ? LA
30 NEXT LA
```

DO WITHOUT PET

CAN YOU MAKE THESE DO THE SAME THING?

```
10 P=5
15 P=P+10
20 ? P
30 IF P>100 THEN 50
40 GOTO 15
50 STOP
```

*

```
10 FOR P=___TO___STEP___
20 ? P
30 _____________
```

CAN YOU COUNT BACKWARDS?

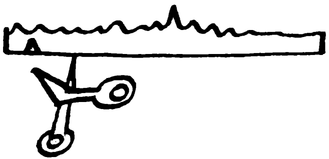
```
10 FOR NO=6 TO 1 STEP -1
20 ? NO
30 NEXT NO
```

THIS IS WHAT IT DOES.

*

1. STARTS AT_________
2. COUNTS BACKWARDS BY_____
3. STOPS AT______
4. EXACT OUTPUT IS____________

DO WITHOUT PET



HERE ARE SOME short cuts

(REMEMBER: ; WILL PRINT OUTPUT ACROSS SCREEN)

SHORTCUT 1:

```
10 FOR I=1 TO 20
20 ? I;
30 NEXT I
```

CAN BE WRITTEN LIKE THIS

```
10 FOR I=1 TO 20:?I; : NEXT I
```

WHAT IS THE OUTPUT?________________________

SHORTCUT 2:

```
15 ?:?
20 FOR X=1 TO 10 STEP 2
30 ? X;
40 NEXT X
```

CAN BE WRITTEN LIKE THIS

```
15 ?:?
20 FOR X=1 TO 10 STEP 2:?X; :NEXT X
```

WHAT IS THE OUTPUT?__________________________

3. HERE IS AN OUTPUT ⟶

```
0 5 10 15 20 25
```

FILL IN THIS FOR-NEXT LOOP TO MAKE THE ABOVE OUTPUT

```
25 ?:?
30 FOR J=___TO___STEP___:?J; :NEXT J
```

4. HERE IS ANOTHER OUTPUT →

```
7  14  21   28   35
```

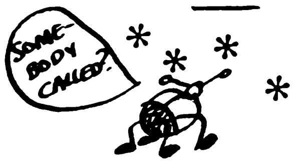
WRITE YOUR OWN FOR-NEXT LOOP TO MAKE THIS OUTPUT.

```
35 ?:?
40 FOR_____________________________
```

1. TYPE IN SHORTCUTS 1 AND 2 AND CHECK YOUR OUTPUT.

2. CHECK YOUR ANSWERS FOR PROBLEMS 3 AND 4.

3. **bugs** YOU CAN USE VARIABLES IN FOR-NEXT LOOPS


SOME-BODY CALLED?

TYPE NEW

```
10 ?"♥"
20 ?"WHAT IS THE LENGTH?": INPUT L
30 FOR C=1 TO L
40 ?" * ";
50 NEXT C
```

VARIABLE LENGTH L

TYPE RUN AND FOR L INPUT 100.

RUN AGAIN WITH L=500

PROBLEM: FIND OUT WHAT VALUE OF L WILL FILL THE SCREEN WITH BUGS.________

************************* nested loops *************************

THERE CAN BE ANY NUMBER OF FOR NEXT LOOPS IN A PROGRAM.

WHEN THE LOOPS ARE INSIDE OF EACH OTHER, THEY ARE CALLED NESTED LOOPS

```
10 FOR X=1 TO 10
20 FOR Y=2 TO 20
30 ?"A"
40 ?"CATCH"
50 NEXT Y
60 NEXT X
70 FOR C=10 TO 15
80 ?"TIGER"
90 NEXT C
100 FOR T=1 TO 50
110 ?"BY"
120 NEXT T
```

THERE ARE ② NESTED LOOPS AND ② REGULAR LOOPS.

OUTER

INNER

```
50 FOR X=1 TO 5
60 INPUT A$,A,B,C,D
70 ?"PENELOPE'S" A$
80 G=(A+B+C+D)/4
90 FOR B=1 TO G
100 ?"*"
110 NEXT B
120 PRINT
130 NEXT X
```

THERE ARE ② NESTED LOOPS.

```
5 FOR C=1 TO 10
10 ?"ALICE AND";
15 FOR A=2 TO 20
20 INPUT X$
25 ?X$
30 FOR B=1 TO 5
35 NEXT B
40 NEXT A
45 NEXT C
```

HOW MANY NESTED LOOPS?____

HOW MANY REGULAR LOOPS?___

DO WITH PET

1. NOW LIST THE PROGRAM BUGS.

   WE WILL USE LINES 30,40 AND 50 AS AN INNER LOOP FOR ANOTHER PROGRAM.

FIRST CHANGE THE BUGS (*) TO COOKIES (●) AND RETYPE LINE 40 USING THE SHORTCUT:

```
40 FOR C=1 TO L: ?" ● "; : NEXT C
```

THIS NEW PROGRAM WILL MAKE DIFFERENT SIZED COOKIE BOXES.

ADD:

```
25 ?"WHAT IS THE WIDTH?":INPUT W
30 FOR I=1 TO W
50 ?
60 NEXT I
```

LIST THE PROGRAM AND NOTICE THE INNER AND OUTER LOOPS.

cookie boxes

OUTER LOOP

INNER LOOP

```
10 PRINT "♥"
20 ?"WHAT IS THE LENGTH?":INPUT L
25 ?"WHAT IS THE WIDTH?": INPUT W
30 FOR I=1 TO W
40 FOR C=1 TO L: PRINT "●"; :NEXT C
50 ?
60 NEXT I
```

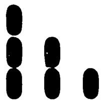
RUN AND INPUT L: 9 W 2
L: 4 W 10
L: 36 W 5
L: 3 W 18
TRY L: 50 W 6 WHAT HAPPENED?________________

TRY YOUR OWN LENGTH______WIDTH______

LIST YOUR FAVORITE LENGTH______WIDTH______

DO WITHOUT PET

EXERCISE 1. USE THE COOKIE BOX PROGRAM AND CHANGE IT SO THE BOXES WILL BE DIFFERENT SHAPES, SUCH AS, TRIANGULAR



(HINT: LINE 1 HAS 1 COOKIE, LINE 2 HAS 2 COOKIES, LINE 3 HAS 3 COOKIES, ETC.)

WRITE YOUR PROGRAM HERE:________________________________

____

____

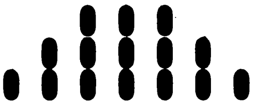
____

____

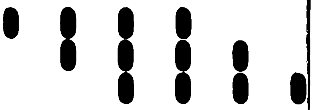
____

____

EXTRA CREDIT!! WRITE COOKIE BOX PROGRAMS SO THE "BOXES" WILL BE TRAPEZOIDAL



OR PARALLELOGRAM-LIKE:



EXERCISE 2: USE NESTED FOR-NEXT LOOPS TO WRITE A PROGRAM WHICH WILL PRINT OUT THE 7,8 AND 9 TIMES TABLES FROM 1 TO 12.

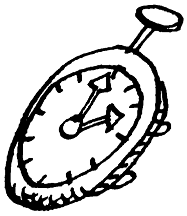
EXAMPLE:

```
1x7=7      1x8=8      1x9=9
2x7=14     2x8=16     2x9=18
3x7=21     3x8=24     3x9=27
  :          :          :
12x7=84    12x8=96    12x9=108
```

(TO MAKE IT EVEN BETTER, PRINT THE TABLES IN 3 COLUMNS WITH HEADINGS IN REVERSE FIELD, 7 TABLE   8 TABLE   9 TABLE.)

MAKE THE CHANGES YOU WROTE ABOVE FOR TRIANGULAR COOKIE BOXES, AND SEE IF IT WORKS!

time delay



SOMETIMES YOU WANT TO CONTROL THE TIME.

YOU MAY WANT YOUR OUTPUT TO PRINT OUT SLOWER.

OR YOU MAY WANT YOUR OUTPUT TO FLASH ON AND OFF FASTER.

OR YOU MAY WANT TO HOLD SOMETHING ON THE SCREEN A LONGER TIME BEFORE CLEARING THE SCREEN.

```
FOR X=1 TO 100: NEXT X
```

→ IS A TIME DELAY

IT DOES NOTHING BUT COUNT TO 100.

NOTICE THERE IS NO PRINTOUT. (IT'S LIKE COUNTING TO YOURSELF)

LET'S USE TIME DELAYS IN OUR COOKIE BOX PROGRAM.

LIST THE PROGRAM (PAGE 43)

ADD

```
23 FOR X=1 TO 1000: NEXT X
```

(THIS WILL CAUSE A DELAY BETWEEN ASKING FOR THE LENGTH AND ASKING FOR THE WIDTH)

ADD

```
65 FOR X=1 TO 50:NEXT X
70 ?"♥"
80 FOR X=1 TO 50:NEXT X
90 GOTO 30
```

(THIS WILL BLINK THE COOKIE BOX.)

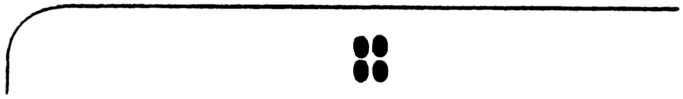
LIST THE PROGRAM AND NOTICE THE *blinking* PATTERN

PRINT ← (LINES 30-60)
DELAY ← (LINE 65)
CLEAR ← (LINE 70)
DELAY ← (LINE 80)

1. RUN THE PROGRAM USING LENGTH 2 AND WIDTH 2.
2. LIST THE PROGRAM AND CHANGE THE TIME DELAY FROM 50 TO 100. WHAT DO YOU NOTICE?____________
3. CHANGE THE TIME DELAY FROM 100 TO 500. WHAT DO YOU NOTICE?__________________________

DO WITHOUT PET

EXERCISE 1. MAKE AN ADDITION TO YOUR COOKIE BOX PROGRAM SO THAT THE BOX WILL BLINK IN THE MIDDLE OF THE FIRST LINE.



WRITE THE LINE(S) THAT YOU CHANGED.

____

DO WITH PET

TYPE IN THE ABOVE CHANGE THAT YOU WROTE AND SEE IF IT WORKS. IF IT DOESN'T, CORRECT IT.

* * *

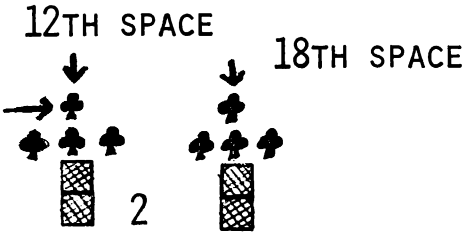
DO WITHOUT PET

IT IS POSSIBLE TO MAKE PARTS OF YOUR PICTURE BLINK BY USING

```
 A FIRST PRINT STATEMENT ;
→DELAY
 LEFT CURSOR AND PRINT BLANKS OVER
 FIRST PRINT
 DELAY
 PRINT AGAIN
```

(REMEMBER: UC IS UP CURSOR, LC IS LEFT CURSOR)

```
               5 ?"♥"
              10 ?"→ (COUNT 12)
              20 ?"
              30 ?"
              40 ?"
 FIRST PRINT→ 50 ?" LC24♡";
   → DELAY──→ 60 FOR X=1 TO 100: NEXT X
 PRINT BLANK→ 70 ?"LC1 SPACE1";
     DELAY──→ 80 FOR X=1 TO 100: NEXT X
 PRINT AGAIN→ 90 ?"LC ♡";
             100 GOTO 60
```



EXERCISE 2: TRY TO WRITE YOUR OWN PROGRAM USING GRAPHICS AND/OR NUMBERS SO THAT ONE PART REMAINS ON THE SCREEN AND THE OTHER PART BLINKS.

DO WITH PET

TYPE IN THE BLINKING PROGRAM USING [♣ X] AND [▦ &] IT IS NAMED AFTER THAT FAMOUS SONG TWO HEARTS BEATING IN THE TREES.

§ homework §

1. GIVEN THIS OUTPUT

```
    9   18   27   36   45
```

WRITE A FOR-NEXT LOOP THAT WOULD PRODUCE THE OUTPUT.

____

____

____

2. HOW MANY NESTED LOOPS ARE IN THIS PROGRAM?________

```
 60 FOR A=1 TO 100
 70 FOR B=2 TO 70
 75 ?B
 80 ?:?
 90 FOR C=1 TO 10
100 NEXT C
105 ?"END"
110 NEXT B
115 NEXT A
```

3. WRITE A PROGRAM USING NESTED FOR-NEXT LOOPS TO PRINT OUT THE 5,6 AND 7 TIMES TABLE FROM 5 TO 20. INCLUDE HEADINGS & COLUMNS.

EXAMPLE:

```
 5x5=25       5x6=30       5x7=35
 6x5=30       6x6=36       6x7=42
 7x5=35       7x6=42       7x7=49
   :            :            :
20x5=100     20x6=120     20x7=140
```

____

____

____

____

____

____

____

4. COULD YOU PRINT OUT THE 4, 9 AND 14 TIMES TABLES FROM 1 TO 12 USING NESTED LOOPS?_________

5. WRITE A TIME DELAY STATEMENT HERE:______________________________

******UGLY BASIC*****

THIS PROGRAM IS NOT A GOOD EXAMPLE OF PROGRAMMING STYLE.

DO WITHOUT PET

IT IS YOUR CHANCE TO SEE IF YOU CAN THINK LIKE A COMPUTER. (A FORM OF MENTAL JOGGING.)

DO NOT RUN THE PROGRAM. FIGURE IT OUT YOURSELF WITH PENCIL AND PAPER. GOOD LUCK.

PROBLEM: FIND THE HIDDEN WORD WITHOUT THE USE OF A COMPUTER.

```
10 GOTO 210
20 FOR A=1 TO 3
30 IF A>1 THEN 50
40 GOTO 140
50 FOR B=1 TO 2
60 IF A<3 THEN 90
70 PRINT "E";
80 GOTO 130
90 IF A=2 THEN 120
100 PRINT "M";
110 GOTO 130
120 PRINT "T";
130 NEXT B
135 GOTO 160
140 PRINT "O";
150 GOTO 50
160 IF A<2 THEN 180
170 GOTO 190
180 PRINT "I";
190 NEXT A
200 GOTO 230
210 PRINT "C";
220 GOTO 20
230 STOP
```

THE HIDDEN WORD IS____________________

UGLY BASIC APPEARED IN THE AUSTRALIAN COMPUTER JOURNAL, COM-3, EDITED BY TIMOTHY MOWCHANUK.

☆☆☆ *heads or tails* ☆☆☆

random numbers ARE NUMBERS PICKED WITH NO SPECIAL PATTERN.

2 4 6 8 10 12 ? WHAT IS THE NEXT NUMBER?___

IF YOU KNOW, THEN THESE NUMBERS HAVE A PATTERN.

DO WITHOUT PET

1 14 144 1444 ? WHAT IS THE NEXT NUMBER?___

DOES THIS HAVE A PATTERN?_____

1 7 3 9 6 2 ? WHAT IS THE NEXT NUMBER?___

IF YOU DON'T KNOW, THEN YOU HAVE NOTICED THERE IS NO SPECIAL PATTERN.

THESE ARE RANDOM NUMBERS!!

OFTEN WE HAVE A SPECIAL POOL OF NUMBERS AND PICK RANDOMLY (IN NO PATTERN) FROM THE POOL.

Special POOL {1,2,3,4,5}

NON-RANDOM NUMBERS 1 2 3 4 5 1 2 3 4 ?

RANDOM NUMBERS 2 1 5 4 3 1 4 4 2 ?

**WHY ARE THE FIRST SET OF NUMBERS NON-RANDOM AND THE SECOND SET RANDOM?________________________________

HERE ARE SOME WAYS YOU MAY HAVE COME ACROSS RANDOM NUMBERS BEFORE.

Grab Bag

IF ALL OF YOUR 25 CLASSMATES BROUGHT IN GRAB BAG PRESENTS AND PUT THEM IN A BAG, AND YOU REACHED IN AND PICKED THE FIRST ONE YOUR HAND TOUCHED......YOU PICKED YOUR PRESENT RANDOMLY.

YOUR POOL WAS THE 25 PRESENTS.

DO WITHOUT PET

PerSon -ON-THE-STREET: WHEN A NEWSPAPER REPORTER IS AT THE SCENE OF A NEWS STORY AND WANTS TO GET RANDOM REACTIONS FROM PEOPLE AROUND, THEY WILL STOP PEOPLE AT RANDOM AND ASK THEM TO TALK INTO THE MICROPHONE.

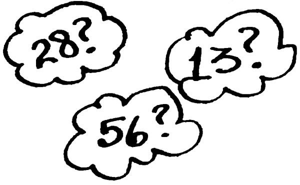
THE POOL IS THE PEOPLE ON THE STREET.

RANDOM NUMBERS COME UP ALOT WITH GAMES.

GUESS MY NUMBER: IF YOU PICK A NUMBER FROM 1 TO 10, I WILL TRY TO GUESS IT.

(UNLESS I HAVE A CLUE, I WILL BE GUESSING AT RANDOM).

WHAT IS MY POOL?__________________________

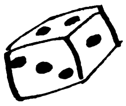


FLIP A COIN: TAKE A COIN AND MAKE A RANDOM GUESS AT WHICH SIDE IT WILL TURN UP WHEN FLIPPED.

WHAT IS YOUR POOL?________________________

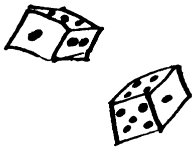
ROLL ONE DIE: SUPPOSE YOU ARE PLAYING A GAME IN WHICH YOU CAN MOVE A CERTAIN NUMBER OF SPACES. THE NUMBER OF SPACES IS DETERMINED BY THROWING ONE DIE.

WHAT IS YOUR POOL?_________________________



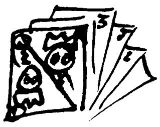
ROLLING TWO DICE: TAKE TWO DICE OR JUST THINK ABOUT THIS. WHEN YOU THROW THEM, WHAT IS THE SMALLEST NUMBER YOU CAN GET? WHAT IS THE LARGEST? WHAT ARE ALL THE NUMBERS IN BETWEEN?

WHAT IS YOUR POOL?_________________________

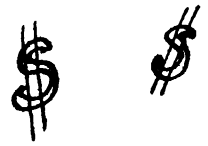


PICK A CARD: YOUR FRIEND HAS A FULL DECK OF CARDS AND ASKS YOU TO PICK ONE, AT RANDOM.

HOW MANY DIFFERENT POSSIBILITIES ARE IN YOUR POOL?_________________________________



LOTTERY TICKETS: HERE ARE ALL THE LOTTERY TICKETS WHICH WERE SOLD FOR A DRAWING ON AN ELECTRIC FLY SWATTER. ONE TICKET WILL BE DRAWN AND BE THE WINNER.



10 11 12 13 14 15 16

WHAT IS THE POOL OF NUMBERS?____________________

THE PET WILL MAKE RANDOM NUMBERS FOR YOU. YOU MAY WANT TO USE THIS WHEN YOU WRITE GAMES OR DRILL PROGRAMS. BUT YOU HAVE TO HELP THE PET PICK RANDOM NUMBERS FROM THE POOL YOU WANT.

ONE RANDOM FUNCTION IS..... **RND(1)**

DO WITH PET

THIS PROGRAM WILL PICK 10 RANDOM NUMBERS.

```
10 FOR I=1 TO 10
20 ?RND(1);
30 NEXT I
```

WHEN I TYPE RUN, I GET:	WHAT DO YOU GET?
.599626516	
.045751745	
.985819907	
.33382718	
.880081949	
.350563504	
.643999994	
.472597055	
.301717142	
.620963628	

LOOK AT THE RANDOM NUMBERS CAREFULLY.

THEY ARE ALL GREATER THAN WHAT INTEGER?_____

THEY ARE ALL SMALLER THAN WHAT INTEGER?______

THESE DO NOT SEEM VERY HELPFUL THE WAY THEY ARE, BUT THEY CAN BE USED FOR PROGRAMS WHERE THE POOL ONLY HAS TWO POSSIBILITIES.

FOR INSTANCE, IF YOU WANT HEADS OR TAILS

TELL THE COMPUTER THAT WHEN THE RANDOM NUMBER IS LESS THAN .5 -----PRINT HEADS AND WHEN THE RANDOM NUMBER IS NOT LESS THAN .5-----PRINT TAILS.

TRY IT!

NEW

```
15 FOR J=1 TO 100
20 X=RND(1)
30 IF RND(1)<.5 THEN ? "HEADS",:GOTO 50
40 ?"TAILS",
50 NEXT J
```

ANOTHER WAY OF USING THE RANDOM NUMBERS AS THEY ARE IS FOR COMPUTER ART.

FOR INSTANCE,

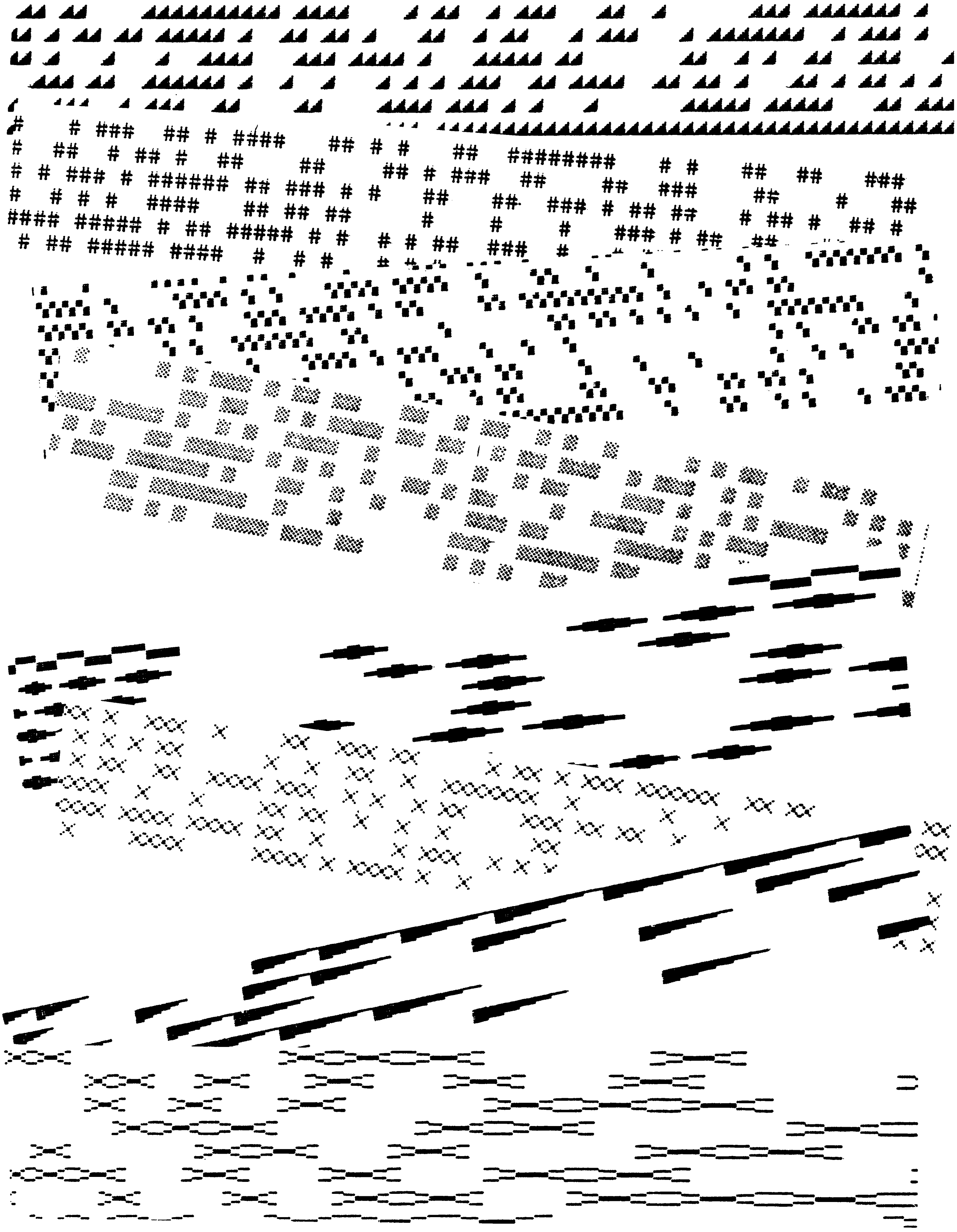
NEW

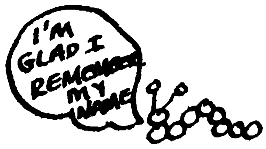
ART

```
10 FOR D=1 TO 25
20 FOR A=1 TO 40
30 IF RND(1)<.5 THEN ?"◩";:GOTO 50
40 ?" _ " ; ←(one space)
50 NEXT A
60 NEXT D
```

THIS IS CALLED INDIAN WEAVE. TRY USING (#) FOR FABRIC, X FOR CROSSTITCH, ▖ FOR SKYSCRAPERS OR ▚ FOR NEEDLEPOINT.

REMEMBER, SINCE THE PICTURE IS RANDOM, IT WILL NEVER LOOK EXACTLY THE SAME TWICE.




I'M GLAD I REMEMBER MY NAME

DO YOU REMEMBER THE INT (INTEGER) FUNCTION?

TO REMIND YOU: INT DROPS THE DIGITS TO THE RIGHT OF THE DECIMAL POINT.

EXAMPLE: INT(3.5) = 3

INT(.289) = 0

INT(23.9) = 23

WE CAN USE INT(INTEGER FUNCTION) WITH RND(RANDOM FUNCTION) TO GET INTEGERS!!

INSTEAD OF USING PLAIN RND(1) I WILL USE INT(RND(1))

```
NEW
10 FOR I=1 TO 10
20 ?INT(RND(1)),
30 NEXT I
```

WHEN I TYPE RUN, I GET:

```
0          0          0          0
0          0          0          0
0          0
```

WHAT DO YOU GET?

WHY DOES THIS HAPPEN?____

____

Suppose we want to get 0 and 1 randomly. — 2 integers starting with 0

We have to make a change:

```
20 ?INT(2*RND(1))
```

When I do it I get:

```
1          0          0          1
0          1          0          0
1          1
```

What do you get?

Suppose we want 0,1 and 2 picked randomly.

Can you guess what the change will be? — 3 integers starting with 0

```
20 ?INT(3*RND(1))
```

Try it and write your results here:

Try it again:

Are the numbers supposed to be in different orders?_____

Why?____

You have probably guessed that INT(4*RND(1)) will generate the integers 0,1,2,3.

TRICK

The TRICK is this number tells the number of integers you will get.

DO WITHOUT PET

FIRST, FIND THE POOL FOR EACH OF THE FOLLOWING STATEMENTS. THEN CHECK THEM ON THE PET.

DO WITH PET

1. INT(6*RND(1)) {________________}
   WRITE PET PRINTOUT HERE____________________
2. INT(10*RND(1)) {________________}
   WRITE PET PRINOUT HERE____________________
3. INT(8*RND(1)) {________________}
   WRITE PET PRINTOUT HERE____________________
4. INT(-2*RND(1)) {________________}
   WRITE PET PRINTOUT HERE____________________

NOW, SUPPOSE WE WANT 1,2,3,4,5,6 TO COME UP RANDOMLY. WE WOULD NEED THIS TO REPRESENT (OR SIMULATE) THE THROWING OF 1 DIE.

WE ALREADY KNOW THAT TO GET 6 INTEGERS WE USE

INT(6*RND(1))

IN ORDER TO START AT 1 INSTEAD OF 0

ADD 1 AT THE END!!

YOU GET INT(6*RND(1)) + 1

USING THE SAME PROGRAM FROM BEFORE, CHANGE LINE 20 TO ? INT(6*RND(1)) + 1,

WHEN I TYPE RUN I GET:

```
3         5         1         6
6         4         2         3
4         1
```

DO WITH PET

YOU TRY IT. WHAT DO YOU GET? ______________________________

____

____

DO WITHOUT PET

QUESTION: INT(6*RND(1)) +2 WOULD RANDOMLY PICK NUMBERS NOT LOWER THAN 2 AND NOT GREATER THAN_______.

DO WITH PET

TRY IT ON THE PET. WHAT DO YOU GET?

____

DO WITHOUT PET

QUESTION: FOR INT(6*RND(1)) + 3, THE POOL IS { }

DO WITH PET

TRY IT ON THE PET. WHAT DO YOU GET?

____

THE RULE IS **INT(8*RND(1))+4**

THE POOL HAS THIS MANY INTEGERS. (8)

THE POOL STARTS AT THIS INTEGER. (4)

FIND THE POOL THESE RANDOM INTEGERS WILL BE PICKED FROM. THEN CHECK ON THE PET.

DO WITH PET

DO WITHOUT PET

1. INT(10*RND(1)) POOL__________________

   WRITE PET PRINTOUT HERE.______________________________

2. INT(3*RND(1)) + 1 POOL__________________

   WRITE PET PRINTOUT HERE.______________________________

3. INT(2*RND(1)) + 3 POOL__________________

   WRITE PET PRINTOUT HERE.______________________________

4. INT(9*RND(1)) + 8 POOL__________________

   WRITE PET PRINTOUT HERE.______________________________

DO WITHOUT PET

WRITE THE STATEMENT WHICH WILL PICK RANDOM INTEGERS FROM EACH POOL.

1. 6,7,8,9,10 ______________________________
2. 51,52,53,54,55,...,100 ____________________
3. 2,3,4,5,6,7,8,9,10,11,12 __________________
4. 1,2,3,4,...N ______________________________

TEST EACH OF YOUR STATEMENTS ON THE PET TO SEE IF THEY ARE CORRECT. MAKE CHANGES IF NECESSARY.

EXERCISES: *assignment*

1. WRITE A PROGRAM TO GENERATE 1000 RANDOM INTEGERS FROM 0 TO 5 AND COUNT THE NUMBER OF TIMES EACH DIGIT OCCURS. PRINT OUT THE RESULTS.

   EXAMPLE: 2 1 3 4 0 1 5 2 0 3 ...ETC.

   ...

   TOTALS: 203 TWOS   175 ONES   190 THREES ETC.

2. WRITE A PROGRAM WHICH WILL SIMULATE (ACT LIKE) FLIPPING A COIN 1000 TIMES. EXAMPLE: HEADS TAILS TAILS HEADS ...ETC. COUNT THE NUMBER OF HEADS AND THE NUMBER OF TAILS AND PRINT THE FINAL TOTALS.

```
(EXAMPLE) TOTALS: HEADS 503  TAILS 497
```

3. WRITE A PROGRAM WHICH ACTS LIKE ROLLING 2 DICE. PRINT OUT 2 SEPARATE NUMBERS, ONE FOR EACH DIE.

```
EXAMPLE:  2   4
          3   1
          4   5
```

PLAN FOR 100 ROLLS OF THE DICE. NUMBERS MUST BE RANDOM.

4. WRITE A PROGRAM WHICH WILL GIVE STUDENTS 2 ONE-DIGIT NUMBERS TO ADD. EXAMPLE: 2 + 3 = ?
5 + 9 = ?
PLAN FOR 10 PROBLEMS, GIVING ANSWERS OF "RIGHT" OR "WRONG". NUMBERS MUST BE RANDOMLY SELECTED.

5. WRITE A PROGRAM WHICH WILL PICK A CARD RANDOMLY FROM A DECK OF 52 CARDS. REMEMBER THERE ARE 4 SUITS (♥,♣,♦,♠) AND 13 CHARACTERS (A,2,3,4,5,6,7,8,9,10,J,Q,K.) PLAN TO PICK AND PRINT OUT 20 CARDS.
EXAMPLE: 2 ♥
J ♦

REVIEW

1. IF $\boxed{\text{R}}$ IS REVERSE FIELD, WHICH OF THE FOLLOWING WILL YOU GET AS OUTPUT FOR THE STATEMENT ? " BE $\boxed{\text{R}}$MINE"

A) BE $\boxed{\text{MINE}}$ B) $\boxed{\text{BE}}$ MINE

C) BE $\boxed{\text{M}}$INE D) $\boxed{\text{BE}}$ $\boxed{\text{MINE}}$ E)NOT GIVEN

2. TO "UNDO" REVERSE FIELD AND RETURN TO REGULAR FIELD,YOU MUST

A) PRESS $\boxed{\text{SHIFT}}$ $\boxed{\text{CLR SCREEN HOME}}$ B) PRESS $\boxed{\text{SHIFT}}$ $\boxed{\text{OFF RVS ON}}$

C) PRESS $\boxed{\text{RUN STOP}}$ D) TYPE REG E)NOT GIVEN

3. LIST 20-50 WILL PRINT OUT THE FOLLOWING LINES OF YOUR PROGRAM:(ASSUME THE ONLY LINE NUMBERS ARE 10,20,30,...,100).

A) 20,30,40,50 B) 20,30,40

C) 30,40 D) 20,50 E)NOT GIVEN

4. LIST 40- WILL PRINT OUT THE FOLLOWING LINES OF YOUR PROGRAM:(ASSUME THE ONLY LINE NUMBERS ARE 10,20,30,...,100).

A) 40,50,60,...,100 B) 10,20,...,40

C) 50,60,...,100 D) 40 ONLY E)NOT GIVEN

5. THE OUTPUT FOR THE STATEMENT X=3:?X+1 IS:

A) 3 B) 4 C) NOTHING D) 2 E)NOT GIVEN

6. WHAT WILL HAPPEN AS A RESULT OF THIS STATEMENT? 40 ?:?:?

A) NOTHING B) SKIP 3 LINES

C) PRINT 3 QUESTION MARKS D) SYNTAX ERROR E)NOT GIVEN

7. A COMMAND WHICH WILL EXECUTE A PROGRAM FROM THE LINE WHERE EXECUTION WAS STOPPED IS:

A) CONT B) GO C) LIST D) RUN E)NOT GIVEN

8. A STATEMENT WHICH WILL CLEAR THE SCREEN IN YOUR PROGRAM IS:

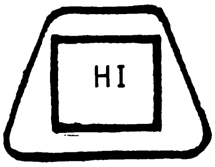
A) 10 ? Q B) 10 ?"♥" C)10 ? "]" D) 10 ?"R" E)NOT GIVEN

9. IF RC IS RIGHT CURSOR ⇐CURSOR⇒ , AND DC IS DOWN CURSOR ⇑CURSOR⇓

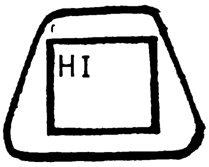
WHICH PICTURE BEST REPRESENTS THE OUTPUT FROM THIS STATEMENT

```
20 ?"DC20RC20 HI"
```

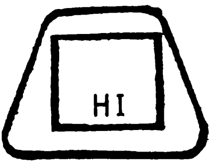
A)



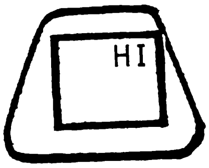
D)



B)



C)



E) NOT GIVEN

10. THE PET SCREEN HAS THE FOLLOWING NUMBER OF CHARACTER PLACES:

A) 40WIDE,30LONG B)25 WIDE,30 LONG

C) 50 WIDE,30 LONG D) 40 WIDE,25 LONG E)NOT GIVEN

11.THE STATEMENT WHICH WILL PUT THE WORD PASTA INTO T$ IS:

A) 30 T$=PASTA B) 30 PASTA=T$

C) 30 T$="PASTA" D) 30 T$<"PASTA" E)NOT GIVEN

12. THE STATEMENT WHICH WILL TEST TO SEE IF THE CONTENTS OF B$ IS THE WORD GRIPE IS:

A) 20 IF B$=GRIPE THEN 40 B) 20 IF B$="GRIPE" THEN 40

C) 20 IF B$<>GRIPE THEN 40 D) 20 B$ = "GRIPE" E)NOT GIVEN

13. THE STATEMENT WHICH WILL TEST TO SEE IF THE CONTENTS OF A$ COMES AFTER THE CONTENTS OF Y$ ALPHABETICALLY IS:

A) IF A$<>Y$ THEN 40 B) IF A$ >Y$ THEN 40

C) IF A$=Y$ THEN 40 D) IF A$ >"Y$" THEN 40 E)NOT GIVEN

14. READ THE FOLLOWING PROGRAM. IF THE INPUT IS ALEX,JINKLEHEIMER, WHAT IS THE OUTPUT?

```
5 INPUT R$,S$
15 IF R$>=S$ THEN 40
25 ? "THE WINNER IS" S$
30 STOP
40 ?" THE WINNER IS"R$
```

A) THE WINNER IS ALEX

B) THE WINNER IS JINKLEHEIMER

C) THE WINNER IS ALEX,JINKLEHEIMER

D) NO OUTPUT

E) NOT GIVEN

15. CHOOSE THE PRINTOUT WHICH WILL RESULT FROM THIS PRINT STATEMENT:

```
? 9;9,"BOTTLES"
```

A)
```
 9 9        BOTTLES
```

B)
```
 9         9         BOTTLES
```

C)
```
 9 9  BOTTLES
```

D)
```
 9         9  BOTTLES
```

E) NOT GIVEN

16.
```
MARBLE          MOUTH 2
```
COULD HAVE COME FROM THE STATEMENT:

A) ?"MARBLEMOUTH2"

B) ?"MARBLE";"MOUTH";2

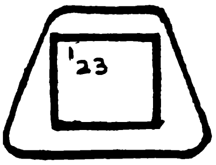
C) ?"MARBLE","MOUTH",2

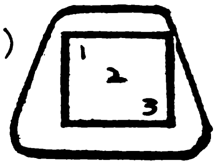
D) ?"MARBLE","MOUTH";2

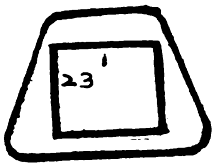
E) NOT GIVEN

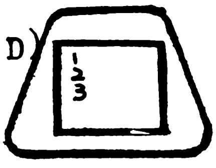
17. READ THIS PROGRAM AND SELECT THE ANSWER WHICH COMES CLOSEST TO THE WAY THE OUTPUT WILL LOOK ON THE PET SCREEN:

```
10 ?1
20 ?TAB(10)2;3
```

A)


B)


C)


D)


E) NOT GIVEN

18. A NUMBER WHICH CAN BE FILLED IN THE FOLLOWING TAB STATEMENT SO THAT M WILL PRINT 6 SPACES TO THE RIGHT OF T:

```
? TAB(15)T TAB( )M
```

A) 21

B) 6

C) 9

D) 25

E) NOT GIVEN

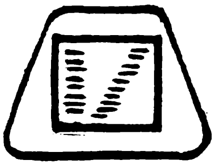
19. A NUMBER WHICH CAN BE FILLED IN THE FOLLOWING SPC STATEMENT

↓
```
? SPC(15)S SPC(   )C
```

SO THAT C WILL PRINT 10 SPACES TO THE RIGHT OF S IS:

A) 25 B) 10 C) 5 D) 40 E) NOT GIVEN

20. LOOK AT THE FOLLOWING OUTPUT FORMAT ON THE PET SCREEN AND SELECT THE PROGRAM WHICH COULD GIVE THIS PATTERN:



A)
```
10 FOR X=1 TO 10
20 Y=10*X
30 ?XTAB(30)Y
40 NEXT X
```

B)
```
10 FOR X=1 TO 10
20 Y=10*X
30 ?X TAB(X) Y
40 NEXT X
```

C)
```
10 FOR X=1 TO 10
20 Y=10*X
30 ?TAB(20)XTAB(30)Y
40 NEXT X
```

D)
```
10 FOR X=1 TO 10
20 Y=10*X
30 ?X TAB(30-X) Y
40 NEXT X
```

E)NOT GIVEN

21. READ THIS PROGRAM AND SELECT THE CORRECT OUTPUT.

```
100 FOR C=2 TO 20 STEP 5
110 ?C
120 NEXT C
```

A) 2,3,4,...,20 B) 2,5,10,15,20

C) 2,7,12,17 D) 3,20 E)NOT GIVEN

22. READ THIS PROGRAM AND SELECT THE CORRECT OUTPUT.

```
300 FOR P=21 TO 25: ?P: NEXT P
```

A) 21,22,23,24,25,26 B) 22,23,24

C) 21,23,25 D) 21,25 E)NOT GIVEN

23. READ THIS PROGRAM AND SELECT THE CORRECT OUTPUT.

```
500 FOR Q=1 TO 3
510 S=S+Q
520 NEXT Q
530 ?S
```

A) 3 B) 6 C) 1,2,3 D)1,3 E)NOT GIVEN

24. FINISH THIS FOR-NEXT STATEMENT SO THE OUTPUT WILL BE 5,10,15.

```
50 FOR K=___ TO___STEP___
60 ?K
70 NEXT K
```

A) FOR K=5 TO 15 STEP 5   B) FOR K=5 TO 10 STEP 5

C) FOR K=5 TO 15 STEP 1   D) FOR K=5 TO 5 STEP 10   E)NOT GIVEN

25. LOOK AT THE FOLLOWING PROGRAM AND DETERMINE THE NUMBER OF NESTED FOR-NEXT LOOPS.

```
15 FOR P=1 TO 5
25 FOR S=1 TO 3
30 ?S
35 NEXT S
40 NEXT P
45 FOR C=1 TO 10
50 ?C
55 NEXT C
```

A) 2 NESTED LOOPS   B) 3 NESTED LOOPS

C) 4 NESTED LOOPS   D) NO NESTED LOOPS   E)NOT GIVEN

26. READ THE FOLLOWING PROGRAM AND DETERMINE THE OUTPUT

```
10 FOR X=1 TO 2
20 FOR P=1 TO 2
30 ?P
40 NEXT P
50 NEXT X
```

A)
```
1
2
1
2
```

B)
```
1 2
```

C)
```
1 2
1 2
```

D)
```
1
1 2
```

E)NOT GIVEN

27. SELECT THE STATEMENT WHICH IS A TIME DELAY.

A) FOR P=1 TO 50:?P:NEXT P   B) FOR P=1 TO 50:NEXT P

C) FOR P=1 TO 100   D) FOR P=1 TO 100;?P   E)NOT GIVEN

28. READ THIS PROGRAM AND SELECT A STATEMENT FOR LINE 70 WHICH WILL MAKE THE PRINTOUT FLASH ON AND OFF.

```
35 ?"TWOLIPS"
40 FOR T=1 TO 100:NEXT T
45 ?"♥"
60 FOR T=1 TO 100:NEXT T
70____________________
```

A) FOR T=1 TO 100:NEXT T   B)GOTO 35   C)STOP   D)?"♥"   E)NOT GIVEN

29. WHICH OF THE FOLLOWING SETS OF NUMBERS APPEAR TO BE RANDOM?

A) 8,1,3,9,8,1,3,9,... B) 1,2,1,2,3,1,2,3,4,...

C) 2,7,9,1,5,3,6,... D) 7,14,21,28,35,...

E) NOT GIVEN

30. WHICH OF THE FOLLOWING "GAMES" HAS A POOL OF 6 NUMBERS?

A) ROLLING 2 DICE B) PICKING 1 CARD FROM A FULL DECK

C) ROLLING 1 DIE D) FLIPPING A COIN

E) NOT GIVEN

31. WHICH OF THE FOLLOWING STATEMENTS WILL GENERATE THE INTEGERS 0,1,2,3?

A) `INT(2*RND(1))` B) `RND(1) + 3`

C) `INT(4*RND(1))` D) `INT(3*RND(1))+2`

E) NOT GIVEN

32. WHICH OF THE FOLLOWING PROGRAMS WOULD MAKE THE BEST USE OF RND (THE RANDOM NUMBER GENERATOR).

A) PRINTING NAMES AND ADDRESSES
B) PRACTICING SUBTRACTION OF WHOLE NUMBERS(0,1,2,3...)
C) THE GAME OF OTHELLO
D) AVERAGING YOUR GRADES
E) NONE OF THESE

PART II: PROGRAM

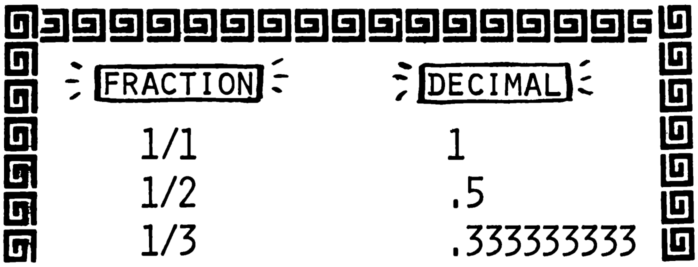
WRITE A PROGRAM USING NESTED FOR-NEXT LOOPS WHICH WILL GENERATE THE NUMERATORS 1,2,3 AND THE DENOMINATORS 1,2,3 TO MAKE THE FRACTIONS 1/1,1/2,1/3,2/1,2/2,2/3,3/1,3/2,3/3.

GIVE THE PRINTOUT IN TWO COLUMNS IN THE MIDDLE OF THE SCREEN. ONE HEADING SHOULD SAY FRACTION IN REVERSE FIELD, AND THE OTHER SHOULD SAY DECIMAL IN REVERSE FIELD.

PRINT THE FRACTIONS UNDER THE HEADING FRACTION (REMEMBER THE COMPUTER WILL NOT PRINT FRACTIONS WITHOUT SOME HELP). PRINT THE DECIMAL EQUIVALENT UNDER THE HEADING DECIMAL.

EXTRA CREDIT: FLASH THE HEADINGS. SURROUND THE TWO COLUMNS WITH A BOX MADE OF GRAPHICS.

LOOKS LIKE THIS:



```
FRACTION        DECIMAL
  1/1             1
  1/2             .5
  1/3             .333333333
```

ETC.

PROGRAMS TO WRITE IN GEOMETRY

FOR EACH PROBLEM DESCRIBED, WRITE YOUR PROGRAM ON PAPER. THEN RUN IT ON THE COMPUTER, DEBUG IT, AND KEEP TRYING UNTIL IT IS CORRECT. USE GRAPHICS AND SPACING TO MAKE IT LOOK GOOD.

HELPFUL HINTS:

⇨ START PROGRAMS WITH 10 REM $\underbrace{\text{MARY LAND}}_{\text{NAME}}$ $\underbrace{\text{9/80}}_{\text{DATE}}$ $\underbrace{\text{POLYSIDES}}_{\text{NAME OF PROGRAM}}$

⇨ WHEN YOU USE AN INPUT, FIRST PRINT A QUESTION.

```
10 ?"WHAT IS YOUR NAME?"
20 INPUT A$
```

⇨ WHEN YOU PRINT OUT AN ANSWER, LABEL IT.

```
100 ?"THE SUM IS" S
```

1. GRAPHICS: MAKE A PICTURE "AS YOU GO", WITHOUT USING GRAPH PAPER FIRST. SELECT SOMETHING THAT WOULD LOOK GOOD IF IT WAS MOVING, SUCH AS A BOAT, SO LATER YOU CAN USE IT WHEN YOU LEARN ANIMATION.

2. ANGLES: THIS PROGRAM SHOULD RANDOMLY PICK DEGREES FROM 0 TO 360. IT SHOULD DETERMINE IF THE ANGLE IS ACUTE, RIGHT, OBTUSE OR "NOT ACUTE,RIGHT OR OBTUSE." FOR 100 TIMES, YOUR PROGRAM SHOULD PRINT OUT,

   AN ANGLE OF (RANDOM #) DEGREES IS (ACUTE,RIGHT ETC.)

3. WHAT'S MY ANGLE?: THIS PROGRAM SHOULD DO THE SAME THING AS ANGLES ABOVE, EXCEPT FOR THE PRINTOUT. THE PROGRAM SHOULD ASK:

   WHAT KIND OF ANGLE HAS (RANDOM #) DEGREES?

   INPUT THE ANSWER, AND TELL THE PERSON IF THEY ARE RIGHT OR WRONG.

4. TRI-ANGLES: THIS PROGRAM SHOULD RANDOMLY PICK DEGREES GREATER THAN 0 AND LESS THAN 180. IT SHOULD SAY "I WILL GIVE YOU 2 ANGLES. FIND THE THIRD THAT WILL MAKE A TRIANGLE, OR SAY NONE." PRINT OUT:

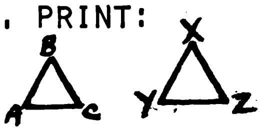
   YOUR ANGLES ARE (RANDOM #) AND (RANDOM #) AND ?

   PRINT THE CORRECT ANSWER AFTER EACH PROBLEM. DO 25 PROBLEMS.

5. POLYSIDES: THE PROGRAM SHOULD STATE "THIS PROGRAM IS ABOUT REGULAR POLYGONS" AND USE GRAPHICS TO DRAW 2 REGULAR POLYGONS (SQUARE, EQUILATERAL TRIANGLE ETC.)
ASK:
    HOW MANY SIDES DOES YOUR POLYGON HAVE?
INPUT THE NUMBER OF SIDES. CALCULATE AND PRINT OUT:
    THE NUMBER OF TRIANGLES IN YOUR POLYGON IS _____
DO THIS FOR 10 PROBLEMS.

6. POLYANGLES: THIS PROGRAM ASKS "HOW MANY SIDES DOES YOUR POLYGON HAVE?" IT INPUTS THE ANSWER AND THEN TESTS TO SEE IF THE PERSON DOESN'T KNOW ABOUT REGULAR POLYGONS. IF THE NUMBER OF SIDES TYPED IN IS 0,1,2, NEGATIVE OR FRACTIONAL, PRINT OUT AN ERROR MESSAGE AND REPEAT THE QUESTION.
FIND THE NUMBER OF TRIANGLES IN THE POLYGON, THEN THE SUM OF THE INTERIOR ANGLES AND EACH INTERIOR ANGLE.
PRINT: THE SUM OF THE ANGLES IS _______AND EACH ANGLE IS _____.
DO THIS 10 TIMES.

7. SIMILAR: STATE THAT TRIANGLES ABC AND XYZ ARE SIMILAR. USE GRAPHICS TO DRAW 2 SIMILAR TRIANGLES. PRINT:
    GIVE ME NUMBERS FOR SIDES
    AB,BC AND XY.



INPUT THESE, AND USING A PROPORTION, CALCULATE XZ.PRINT:
    THE VALUE OF XZ IS ______
DO THIS 5 TIMES.

8. TRI-SIDES: THIS PROGRAM IS ABOUT THE SIDES OF TRIANGLES.
PRINT:
    GIVE ME 3 SIDES.
INPUT AND DETERMINE IF THE TRIANGLE IS EQUILATERAL, ISOSCELES, OR SCALENE. USE GRAPHICS TO DRAW A TRIANGLE AND PRINT:
    YOUR TRIANGLE IS (SCALENE, ETC.)
DO THIS 20 TIMES.

9. WHAT'S MY TRIANGLE?: USE A RANDOM NUMBER GENERATOR TO GIVE 3 NUMBERS FROM 1 TO 10. PRINT:
    THE SIDES ARE (RANDOM#),(RANDOM#) AND (RANDOM #),
    IS THE TRIANGLE EQUILATERAL,ISOSCELES,SCALENE OR NONE?
INPUT AND GIVE THE CORRECT ANSWER. ASK YOUR TEACHER HOW YOU KNOW WHEN THERE IS NO TRIANGLE.

10. **PYTHAGORAS:** EXPLAIN THAT A,B, AND C ARE THE SIDES OF A RIGHT TRIANGLE WITH C THE HYPOTENUSE. ASK FOR THE LENGTHS OF ANY 2 SIDES USING ZERO FOR THE UNKNOWN SIDE. ASK:

    WHAT IS THE VALUE OF A,B,C IN YOUR RIGHT TRIANGLE?

    (SAMPLE ANSWER IS 2,3,0 OR 0,1,8 ETC. REMEMBER C MUST BE THE HYPOTENUSE.)

    INPUT, AND USING THE PYTHAGOREAN THEOREM COMPUTE THE THIRD "SIDE". PRINT:

    YOUR MISSING SIDE IS _____.

    DO THESE PROBLEMS 10 TIMES.

11. **AM I A RIGHT TRIANGLE?:** EXPLAIN THAT A,B AND C ARE THE SIDES OF A TRIANGLE. ASK:

    WHAT ARE THE SIDES OF YOUR TRIANGLE?

    INPUT AND DETERMINE WHETHER IT IS A RIGHT TRIANGLE (USE THE PYTHAGOREAN THEOREM.) PRINT THE ANSWER. DO 20 PROBLEMS.

12. **CIRCLE:** USE A FOR-NEXT LOOP TO GET 50,60,70,...200 FOR THE VALUES OF THE RADIUS. CALCULATE THE AREA OF THE CIRCLE BY USING 22/7 FOR PI AND 3.1416 FOR PI. FIND THE DIFFERENCE (SUBTRACT) EACH TIME.

    PRINT THE OUTPUT IN A FOUR COLUMN TABLE MADE WITH GRAPHICS AND INCLUDING LABELS.

RADIUS	PI=22/7	PI=3.1416	DIFFERENCE
50	7857.14286	7854.00001	3.14284992
60	....	...	...
⋮			

    (IF THE NUMBERS GET TOO BIG,TRY SMALLER RADII.)

13. **CONGRUENT:** CONGRUENT TRIANGLES HAVE EQUAL CORRESPONDING SIDES. ASK FOR THE LENGTHS OF ALL 3 SIDES OF ONE TRIANGLE AND ALL 3 SIDES OF ANOTHER TRIANGLE. (WHOEVER TYPES IN THE SIDES, OF COURSE, KNOWS WHETHER THE TRIANGLES ARE CONGRUENT.)

    YOUR JOB IS TO HAVE THE COMPUTER DETERMINE WHETHER THEY ARE CONGRUENT, AND PRINT OUT A RESPONSE.

    (YOU CAN MAKE IT EASIER BY ASKING FOR THE SIDES IN A PARTICULAR ORDER SUCH AS LONGEST TO SHORTEST:
    EXAMPLE: 8,6,3,5,4,3

    OR YOU CAN MAKE IT HARDER BY ACCEPTING ANY ORDER.
    EXAMPLE: 6,8,3,3,4,5).

14. TRIPLETS: IN ADDITION TO THE EQUATION $A^2 + B^2 = C^2$, OTHER FORMULAS HAVE BEEN DISCOVERED FOR GENERATING PYTHAGOREAN TRIPLETS; THAT IS, 3 INTEGERS WHICH WILL MAKE A RIGHT TRIANGLE SUCH AS 3,4,5.

    USE ANY OF THE FORMULAS BELOW TO PRINT OUT THE TRIPLETS AND USE GRAPHICS IN YOUR OUTPUT.

    A) $(M, \frac{M^2-1}{2}, \frac{M^2+1}{2})$ M IS ODD. B) $(2M, M^2-1, M^2+1)$.

    C) $(M^2-N^2, 2MN, M^2+N^2)$ WHERE $M > N$.

* 15. COORDINATE 1: ASK FOR THE COORDINATES OF POINTS A,B,C. INPUT AND TEST TO SEE IF THEY ARE COLLINEAR. IF THEY ARE, PRINT:

    THESE POINTS ARE COLLINEAR (WITH GRAPHICS)

    IF NOT, CALCULATE THE PERIMETER OF THE TRIANGLE FORMED, THE COORDINATES OF THE MIDPOINT OF AB AND THE LENGTH OF THE MEDIAN CD. PRINT:

    THE PERIMETER OF TRIANGLE ABC IS ____

    THE LENGTH OF THE MEDIAN TO AB IS ____

    INCLUDE GRAPHICS WHICH SHOWS THE MEDIAN OF A TRIANGLE.

    [* HINT: USE X1,Y1,X2,Y2,... WHEN INPUTTING COORDINATES]

*16. COORDINATE 2: ASK FOR THE COORDINATES OF 4 POINTS IN THE XY PLANE. INPUT AND DETERMINE WHETHER THE QUADRILATERAL FORMED BY JOINING THE POINTS IN ORDER IS A PARALLELOGRAM. (FIND BOTH PAIRS OF OPPOSITE SIDES ARE PARALLEL, OR BOTH PAIRS OF OPPOSITE SIDES ARE CONGRUENT OR 1 PAIR OF OPPOSITE SIDES IS CONGRUENT AND PARALLEL.)

    INCLUDE A PICTURE OF A PARALLELOGRAM IN YOUR OUTPUT.

17. INTERIOR: THIS PROGRAM SHOULD STATE "THIS IS A PROGRAM ABOUT THE INTERIOR AND EXTERIOR ANGLES OF A REGULAR POLYGON AND SHOW A REGULAR POLYGON. ASK :

    WHAT IS THE SUM OF THE INTERIOR ANGLES?

    INPUT, CALCULATE, AND PRINT OUT:

    THE NUMBER OF SIDES IS _____. OR THERE IS NO SUCH POLYGON.

    THEN ASK:

    WHAT IS THE MEASURE OF EACH INTERIOR ANGLE?

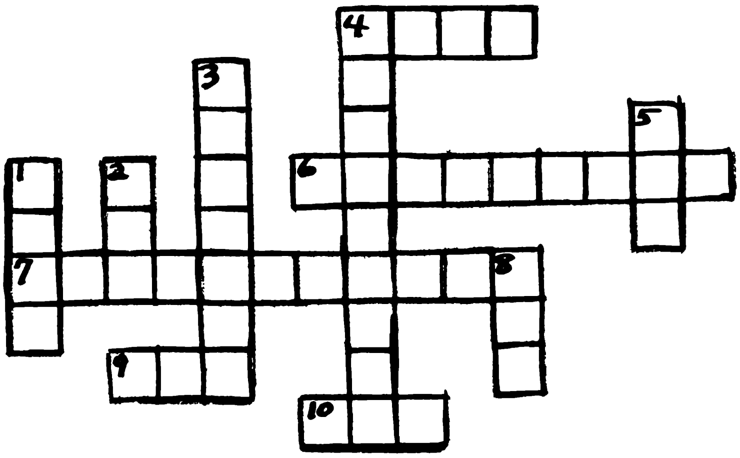
    INPUT, CALCULATE AND PRINT OUT:

    THE NUMBER OF SIDES IS ____ OR THERE IS NO SUCH POLYGON.

    THEN ASK: WHAT IS THE SUM OF THE EXTERIOR ANGLES?

    INPUT, CALCULATE AND PRINT OUT:

    THE NUMBER OF SIDES IS ____ OR THERE IS NO SUCH POLYGON.



ACROSS

4. STATEMENT ADDED TO A FOR-NEXT TO COUNT BY NUMBERS OTHER THAN 1.
6. PROGRAM STATEMENT(S) USED FOR BLINKING CHARACTERS ON AND OFF.
7. FOR-NEXT LOOPS INSIDE OTHER FOR-NEXT LOOPS HAVE THIS NAME.
9. A FUNCTION USED TO MAKE DECIMALS INTO INTEGERS.
10. A FUNCTION USED TO MAKE RANDOM NUMBERS.

DOWN

1. A FUNCTION WHICH WILL START EXECUTION OF A PROGRAM WHERE IT HAD BEEN STOPPED.
2. THE NAME OF THE KEY USED FOR REVERSE FIELD.
3. A STATEMENT WHICH IS A KIND OF COUNTER.
4. USED IN OUTPUT STATEMENTS TO KEEP THE PRINTOUT PACKED ON A LINE.
5. USED IN OUTPUT STATEMENTS TO PUT PRINTOUT INTO COLUMNS.
8. USED IN OUTPUT STATEMENTS TO PUT ANY NUMBER OF SPACES BETWEEN PRINTOUTS.